1983年6月11日日全食光谱

波长定标

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3589.64 | Sc II | 3602.46 | Fe I | 3613.43 | Zr II |
| 3589.74 | V II | 3602.77 | Fe I | 3613.49 | Gd II |
| 3590.47 | Gd II | 3603.20 | Fe I | 3613.67 | Cr I |
| 3590.48 | Sc II | 3603.61 | Cr II | 3613.80 | Mg II |
| 3590.60 | Ce II | 3603.80 | Cr II | 3613.84 | Sc II |
| 3591.34 | Fe I | 3603.86 | Cr II | 3614.11 | Fe I |
| 3591.75 | Co I | 3604.21 | Fe II | 3614.55 | Fe I |
| 3591.91 | Gd II | 3604.69 | Fe I | 3614.79 | Zr II |
| 3592.01 | V II | 3604.96 | Fe I | 3615.19 | Fe I |
| 3592.60 | Nd II | 3605.20 | Fe I | 3615.39 | Co I |
| 3592.88 | Fe II | 3605.33 | Cr I | 3615.82 | Nd II |
| 3592.92 | Y II | 3605.37 | Co I | 3616.15 | Fe I |
| 3593.02 | Cr II | 3605.45 | Fe I | 3616.33 | Fe I |
| 3593.09 | Ti II | 3605.66 | Gd II | 3616.56 | Er II |
| 3593.32 | V II | 3606.38 | Fe I | 3617.53 | Fe I |
| 3593.33 | Fe II | 3606.68 | Fe I | 3617.79 | Fe I |
| 3593.44 | Gd II | 3606.85 | Ni I | 3618.39 | Fe I |
| 3593.49 | Cr I | 3608.15 | Fe I | 3618.77 | Fe I |
| 3593.80 | Fe I | 3608.40 | Cr I | 3619.39 | Ni I |
| 3594.63 | Fe I | 3608.49 | Fe II | 3620.00 | Fe I |
| 3594.87 | Co I | 3608.66 | Cr II | 3620.50 | V II |
| 3595.12 | Mn I | 3608.86 | Fe I | 3620.88 | Fe i |
| 3595.29 | Fe I | 3608.89 | Ti II | 3621.20 | V II |
| 3595.66 | Fe I | 3609.31 | Ni I | 3621.46 | Fe I |
| 3596.05 | Ti II | 3610.15 | Ti I | 3622.00 | Fe I |
| 3596.20 | Fe I | 3610.16 | Fe I | 3622.15 | Ce II |
| 3597.70 | Ni I | 3610.46 | Ni I | 3623.19 | Fe I |
| 3600.58 | Ce II | 3610.76 | Gd II | 3623.32 | Sm II |
| 3600.74 | Y II | 3610.85 | Cr II | 3623.77 | Fe I |
| 3600.80 | Co I | 3611.06 | Y II | 3624.11 | Ca I |
| 3601.07 | La II | 3611.90 | Zr II | 3624.30 | Fe I |
| 3601.42 | Fe I | 3612.74 | Ni I | 3624.34 | Co I |
| 3601.93 | Y II | 3612.94 | Fe I | 3624.73 | Ni I |
| 3602.08 | Co I | 3613.08 | Zr II | 3624.83 | Ti II |
| 3602.28 | Ni I | 3613.39 | Gd II | 3625.14 | Fe I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3625.61 | V II | 3638.77 | Sm II | 3651.00 | Sm II |
| 3626.08 | Ti I | 3639.33 | Fe I | 3651.10 | Fe I |
| 3627.71 | Ti II | 3639.44 | Co I | 3651.25 | Co I |
| 3627.81 | Co I | 3639.57 | Pb I | 3651.47 | Fe I |
| 3628.09 | Fe I | 3640.39 | Fe I | 3651.80 | Sc II |
| 3628.60 | Ca I | 3641.01 | Cr I | 3651.97 | He I |
| 3628.71 | Y II | 3641.33 | Ti II | 3652.12 | He I |
| 3629.10 | Sc II | 3641.45 | Fe I | 3652.26 | Ce II |
| 3629.51 | Gd II | 3641.47 | Cr I | 3652.54 | Co I |
| 3630.03 | Zr II | 3642.39 | Ni I | 3653.11 | Ce II |
| 3630.26 | Ni I | 3642.67 | Ti I | 3653.50 | Ti I |
| 3630.35 | Fe I | 3642.78 | Sc II | 3653.67 | Ce II |
| 3630.58 | Ni I | 3643.18 | Ca I | 3653.76 | Fe I |
| 3630.74 | Sc II | 3643.63 | Fe I | 3653.91 | Cr I |
| 3631.10 | Fe I | 3643.72 | Fe I | 3654.44 | Co I |
| 3631.46 | Fe I | 3643.82 | Fe I | 3654.59 | Ti I |
| 3632.04 | Fe I | 3644.70 | Cr II | 3654.88 | Dy II |
| 3632.56 | Fe I | 3644.77 | Co I | 3654.97 | Ce II |
| 3632.98 | Fe I | 3645.09 | Fe I | 3655.46 | Fe I |
| 3633.13 | Y II | 3645.29 | Sm II | 3655.66 | Fe I |
| 3633.31 | CH | 3645.31 | Sc II | 3655.85 | Ce II |
| 3634.04 | Cr II | 3645.43 | La II | 3656.15 | Gd II |
| 3634.24 | He I | 3645.62 | Gd II | 3656.23 | Fe I |
| 3634.29 | Sm II | 3645.78 | Fe II | 3656.26 | Cr I |
| 3634.33 | Fe I | 3645.82 | Fe II | 3656.50 | Fe II |
| 3634.71 | Co I | 3646.19 | Gd II | 3656.97 | Co I |
| 3634.76 | Gd II | 3646.20 | Ti I | 3657.14 | Fe I |
| 3634.93 | Sm II | 3646.96 | Ce II | 3657.27 | H3 |
| 3634.94 | Ni I | 3647.08 | Co I | 3657.42 | Pr II |
| 3635.19 | Fe I | 3647.66 | Co I | 3657.70 | Ni I |
| 3635.33 | Y II | 3647.84 | Fe I | 3657.89 | Fe I |
| 3635.46 | Ti II | 3648.20 | Nd II | 3658.10 | Ti I |
| 3636.23 | Fe I | 3648.30 | Pr II | 3658.64 | H3 |
| 3636.46 | Zr II | 3648.53 | Cr I | 3659.23 | Ce II |
| 3636.59 | Cr I | 3648.78 | Dy II | 3659.42 | H3 |
| 3637.00 | Fe I | 3649.51 | Fe I | 3659.52 | Fe I |
| 3637.15 | La II | 3649.53 | Sm II | 3659.77 | Ti II |
| 3637.83 | Sb I | 3650.03 | Fe I | 3660.28 | H3 |
| 3637.86 | Fe I | 3650.28 | Fe I | 3660.33 | Fe I |
| 3638.16 | Fe I | 3650.37 | Cr II | 3660.63 | Ti I |
| 3638.30 | Fe I | 3650.54 | Fe I | 3661.22 | H3 |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3661.59 | Ni I | 3670.81 | Fe I | 3682.23 | Fe I |
| 3662.08 | La II | 3670.84 | Sm II | 3682.81 | H2 |
| 3662.24 | Ti II | 3671.28 | Zr I | 3683.05 | Co I |
| 3662.26 | H3 | 3671.48 | H2 | 3683.13 | V I |
| 3662.84 | Cr I | 3672.12 | Fe I | 3683.48 | Pb I |
| 3663.21 | Cr I | 3672.17 | Ce II | 3684.11 | Fe I |
| 3663.41 | H2 | 3672.69 | Fe I | 3684.54 | Fe I |
| 363663.46 | Fe I | 3672.79 | Ce II | 3684.96 | Co I |
| 3663.59 | V I | 3673.09 | Fe I | 3685.19 | Ti II |
| 3664.10 | Ni I | 3673.49 | Pr | 3685.55 | Cr I |
| 3664.25 | Sc II | 3673.76 | H2 | 3685.80 | Nd II |
| 3664.54 | Fe I | 3673.89 | Fe I | 3686.00 | Fe I |
| 3664.62 | Y II | 3674.06 | Ni I | 3686.26 | V I |
| 3664.68 | H2 | 3674.15 | Ni I | 3686.34 | Gd II |
| 3664.95 | Cr II | 3674.74 | Zr II | 3686.83 | H1 |
| 3665.18 | Nd II | 3674.77 | Fe II | 3687.10 | Fe I |
| 3665.81 | Tm II | 3675.31 | Ca I | 3687.25 | Cr I |
| 3666.10 | H2 | 3675.70 | V I | 3687.46 | Fe I |
| 3666.19 | Cr I | 3675.98 | Fe I | 3687.66 | Fe I |
| 3666.24 | Fe I | 3676.31 | Fe I | 3688.17 | Fe I |
| 3666.54 | Sc II | 3676.33 | Cr I | 3688.42 | Ni I |
| 3666.77 | Fe I | 3676.36 | H2 | 3688.48 | Fe I |
| 3666.94 | Fe I | 3676.68 | V I | 3689.08 | Fe I |
| 3667.25 | Fe I | 3677.48 | Fe I | 3689.46 | Fe I |
| 3667.68 | H2 | 3677.63 | Fe I | 3689.90 | Fe I |
| 3667.98 | Ce I | 3677.69 | Cr II | 3689.92 | Ti I |
| 3668.21 | Fe I | 3677.86 | Cr II | 3690.28 | V I |
| 3668.22 | Ni I | 3678.34 | Sc II | 3690.45 | Fe I |
| 3668.46 | Zr II | 3678.98 | Fe I | 3690.71 | Co I |
| 3668.89 | Fe I | 3679.14 | Ti I | 3690.73 | Fe I |
| 3669.15 | Fe I | 3679.33 | Fe I | 3691.18 | Fe I |
| 3669.24 | Ni I | 3679.36 | H2 | 3691.31 | Fe I |
| 3669.41 | V II | 3679.67 | Ti II | 3691.56 | H1 |
| 3669.47 | H2 | 3679.82 | Cr I | 3691.97 | Fe II |
| 3669.52 | Fe I | 3680.39 | Fe I | 3692.22 | V I |
| 3669.68 | Fe I | 3680.68 | Fe I | 3692.65 | Er II |
| 3669.84 | Mn I | 3680.80 | Fe I | 3693.01 | Fe I |
| 3670.04 | Co I | 3681.22 | Fe I | 3693.11 | Co I |
| 3670.07 | Fe I | 3681.69 | Cr I | 3693.48 | Co I |
| 3670.43 | Ni I | 3682.15 | Fe I | 3694.01 | Fe I |
| 3670.52 | Mn I | 3682.17 | Fe I | 3694.19 | Yb II |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3694.91 | Ce II | 3707.46 | Co I | 3717.39 | Ti I |
| 3695.05 | Fe I | 3707.47 | Fe I | 3717.84 | Fe I |
| 3695.65 | Fe I | 3707.55 | Ti I | 3718.16 | V II |
| 3695.86 | V I | 3707.56 | Fe I | 3718.38 | Ce II |
| 3696.39 | Ti II | 3707.83 | Fe I | 3718.41 | Fe I |
| 3697.15 | H1 | 3707.92 | Fe I | 3718.62 | CN |
| 3697.43 | Fe I | 3708.18 | Fe I | 3718.88 | Sm II |
| 3697.49 | Zr II | 3708.45 | Fe I | 3718.93 | Fe I |
| 3698.17 | Zr II | 3708.65 | Sm II | 3719.45 | Gd II |
| 3698.65 | Ce II | 3708.82 | Co I | 3719.93 | Fe I |
| 3699.02 | Co I | 3709.13 | Gd II | 3720.17 | Fe I |
| 3699.15 | Fe I | 3709.25 | Fe I | 3720.38 | Ti I |
| 3699.73 | Gd II | 3709.27 | Zr II | 3720.48 | CN |
| 3700.13 | V II | 3709.29 | Ce II | 3721.51 | Fe I |
| 3700.34 | V II | 3709.34 | V II | 3721.63 | Ti I |
| 3700.96 | V II | 3709.54 | Fe I | 3721.94 | H1 |
| 3701.09 | Fe I | 3709.66 | Fe I | 3722.03 | Fe I |
| 3701.36 | Tm II | 3709.93 | Ce II | 3722.23 | Fe I |
| 3701.63 | Ni II | 3709.96 | Ti I | 3722.48 | Ni l |
| 3702.03 | Fe I | 3710.30 | Y II | 3722.56 | Fe I |
| 3702.24 | Co I | 3711.12 | V II | 3722.57 | Ni I |
| 3702.29 | Ti I | 3711.23 | Fe I | 3723.51 | Nd II |
| 3702.50 | Fe I | 3711.41 | Fe I | 3723.63 | Ti II |
| 3702.86 | Tb II | 3711.65 | Co I | 3724.11 | Ti II |
| 3703.56 | Fe I | 3711.97 | H1 | 3724.38 | Fe I |
| 3703.58 | V I | 3712.18 | Co I | 3724.57 | Ti I |
| 3703.70 | Fe I | 3712.76 | Sm II | 3724.90 | Sm II |
| 3703.82 | Fe I | 3712.97 | Cr II | 3724.90 | Eu II |
| 3703.86 | H1 | 3713.54 | La II | 3724.98 | V II |
| 3704.06 | Co I | 3713.70 | Ni I | 3725.50 | Fe I |
| 3704.34 | Fe I | 3713.73 | Ti I | 3725.58 | Ce II |
| 3704.46 | Fe I | 3714.20 | Nd II | 3725.85 | Cr I |
| 3704.70 | V I | 3714.77 | Zr II | 3726.85 | Cr I |
| 3704.85 | Tm II | 3714.81 | Nd II | 3727.10 | Fe I |
| 3705.04 | V I | 3714.90 | Eu II | 3727.35 | V II |
| 3705.26 | Fe I | 3715.19 | Cr II | 3727.37 | Cr II |
| 3705.57 | Fe I | 3715.48 | V I | 3727.53 | Fe I |
| 3706.03 | Ca II | 3715.53 | La II | 3727.62 | Fe I |
| 3706.22 | Ti II | 3715.91 | Fe I | 3727.72 | Zr II |
| 3707.05 | Fe I | 3716.36 | Ce II | 3728.04 | Ru I |
| 3707.13 | Cr II | 3716.44 | Fe I | 3728.13 | Nd II |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3728.33 | VII | 3746.93 | Fe I | 3764.38 | Sm II |
| 3728.42 | Ce II | 3747.55 | Y II | 3765.54 | Fe I |
| 3728.47 | Sm II | 3748.01 | Ti II | 3765.70 | Fe I |
| 3728.67 | Fe I | 3748.26 | Fe I | 3766.03 | CN |
| 3729.34 | Fe I | 3748.68 | Cr II | 3766.25 | CN |
| 3729.74 | Zr II | 3749.00 | Cr I | 3766.67 | Fe I |
| 3730.39 | Fe I | 3749.49 | Fe I | 3767.04 | Gd II |
| 3730.48 | Co I | 3749.93 | Co I | 3767.36 | Sm II |
| 3730.84 | Gd II | 3750.15 | H1 | 3768.03 | Fe I |
| 3731.26 | Zr II | 3750.65 | Zr II | 3768.25 | CN |
| 3731.93 | Mn I | 3750.88 | V II | 3768.52 | Fe I |
| 3732.39 | Co I | 3751.60 | Zr II | 3769.45 | Gd II |
| 3732.76 | V II | 3752.42 | Fe I | 3769.64 | Nd II |
| 3733.32 | Fe I | 3752.86 | Ti I | 3770.30 | Fe I |
| 3734.37 | H1 | 3753.15 | Fe I | 3770.63 | H1 |
| 3734.87 | Fe I | 3753.61 | Fe I | 3771.10 | CN |
| 3735.16 | V II | 3754.35 | Co I | 3771.65 | Ti I |
| 3735.93 | Co I | 3755.13 | CN | 3771.81 | CN |
| 3736.41 | La II | 3755.42 | Ce II | 3772.53 | Ni I |
| 3736.81 | Ni I | 3755.56 | Fe II | 3773.24 | CN |
| 3737.13 | Fe I | 3756.27 | CN | 3773.56 | CN |
| 3737.55 | Cr II | 3756.80 | Pr II | 3773.70 | Fe I |
| 3738.03 | Nd II | 3757.17 | Cr I | 3774.33 | Y II |
| 3738.31 | Fe I | 3757.53 | Sm II | 3774.65 | Ti II |
| 3738.76 | V I | 3757.68 | Ti I | 3775.57 | Ni I |
| 3739.23 | Ni I | 3758.23 | Fe I | 3775.86 | Fe I |
| 3739.53 | Fe I | 3758.97 | Sm II | 3776.33 | CN |
| 3740.25 | Fe I | 3759.29 | Ti I | 3776.49 | Tb II |
| 3740.34 | CN | 3759.90 | CN | 3776.56 | Y II |
| 3741.06 | Ti I | 3760.24 | V II | 3777.45 | Fe I |
| 3741.50 | V I | 3760.53 | Fe I | 3777.66 | CN |
| 3741.90 | CN | 3760.71 | Gd II | 3778.32 | Fe I |
| 3742.62 | Fe I | 3761.06 | Fe I | 3778.51 | Fe i |
| 3742.97 | Cr I | 3761.33 | Tm II | 3778.70 | Fe I |
| 3743.47 | Fe I | 3761.55 | CN | 3779.21 | Fe I |
| 3743.87 | Sm II | 3762.09 | Nd ii | 3779.42 | Fe I |
| 3744.11 | Fe I | 3762.31 | CN | 3779.73 | CN |
| 3744.49 | Cr I | 3763.00 | Gd II | 3780.32 | CN |
| 3745.49 | Co I | 3763.38 | Mn I | 3780.52 | CN |
| 3745.61 | Sm II | 3763.79 | Fe I | 3781.19 | Fe I |
| 3745.97 | Zr II | 3764.09 | Fe II | 3781.51 | Fe II |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3781.94 | Fe I | 3796.00 | Fe I | 3811.98 | CN |
| 3782.22 | CN | 3796.31 | CN | 3812.18 | Y II |
| 3782.45 | Fe I | 3796.66 | CN | 3812.47 | Co II |
| 3783.35 | Fe II | 3796.99 | Cr I | 3813.06 | Fe I |
| 3783.53 | Ni I | 3797.90 | H1 | 3813.26 | Ti I |
| 3783.90 | CN | 3798.28 | Ti I | 3813.39 | Ti II |
| 3784.25 | Nd II | 3798.66 | V I | 3813.89 | Fe I |
| 3784.68 | CN | 3799.22 | CN | 3814.33 | CN |
| 3785.32 | CN | 3799.54 | Fe I | 3814.60 | CN |
| 3785.42 | Mn I | 3799.81 | Ti II | 3814.86 | Ti I |
| 3785.71 | Fe I | 3800.03 | CN | 3815.43 | Cr I |
| 3786.04 | Ti I | 3800.50 | CN | 3815.76 | CN |
| 3786.33 | Ti II | 3800.89 | Sm II | 3816.02 | Pr II |
| 3786.84 | Er II | 3801.29 | Gd II | 3816.28 | CN |
| 3787.16 | Fe I | 3801.80 | Fe I | 3816.64 | Gd II |
| 3787.41 | CN | 3802.48 | CN | 3816.98 | CN |
| 3787.88 | Fe I | 3802.92 | Nb I | 3817.38 | CN |
| 3788.13 | Sm II | 3803.10 | Ce II | 3817.64 | Ti I |
| 3788.82 | CN | 3803.47 | Nd II | 3817.84 | CN |
| 3789.04 | CN | 3803.68 | CN | 3818.24 | Y I |
| 3789.49 | Cr I | 3804.01 | Fe I | 3818.34 | Y II |
| 3790.10 | Fe I | 3804.59 | V I | 3818.67 | CN |
| 3790.23 | Cr I | 3804.70 | CN | 3819.25 | He I |
| 3790.47 | V I | 3805.35 | Fe I | 3819.56 | Cr I |
| 3790.76 | Fe I | 3805.73 | CN | 3819.67 | Eu II |
| 3791.17 | Gd II | 3806.20 | Fe I | 3819.96 | V I |
| 3791.50 | Fe I | 3806.72 | Mn I | 3820.43 | Fe I |
| 3791.73 | Fe I | 3807.14 | Ni I | 3820.81 | CN |
| 3792.16 | Fe I | 3807.53 | Fe I | 3821.18 | Fe I |
| 3792.42 | Cr I | 3807.93 | Cr i | 3821.73 | Cn |
| 3792.64 | CN | 3808.12 | Ce II | 3821.92 | Fe II |
| 3792.83 | Fe I | 3808.34 | CN | 3822.33 | CN |
| 3793.29 | Cr I | 3808.70 | Y II | 3822.89 | V I |
| 3793.61 | Ni I | 3809.15 | CN | 3823.08 | CN |
| 3793.97 | Sm II | 3809.49 | CN | 3823.51 | Mn I |
| 3794.34 | Fe I | 3809.69 | CN | 3824.07 | Fe I |
| 3794.37 | V II | 3810.10 | CN | 3824.44 | Fe I |
| 3794.78 | La II | 3810.62 | CN | 3824.91 | Fe II |
| 3794.96 | V I | 3810.76 | Fe I | 3825.22 | CN |
| 3795.00 | Fe I | 3811.32 | Ni I | 3825.88 | Fe I |
| 3795.54 | Fe I | 3811.65 | CN | 3826.29 | Pr II |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3826.63 | Fe I | 3842.05 | Co I | 3857.91 | Sm II |
| 3826.97 | V II | 3842.46 | CN | 3858.30 | Ni I |
| 3827.51 | Zr II | 3843.00 | Sc II | 3858.69 | CN |
| 3827.64 | CN | 3843.26 | Fe I | 3859.52 | CN |
| 3827.98 | CN | 3843.98 | Mn I | 3859.85 | CN |
| 3828.18 | Ti I | 3844.24 | CN | 3860.42 | CN |
| 3828.51 | Fe I | 3844.58 | Gd II | 3860.92 | Fe II |
| 3828.84 | V I | 3845.17 | Fe I | 3861.16 | Co I |
| 3829.12 | Fe I | 3845.47 | Co I | 3861.34 | Fe I |
| 3829.46 | Fe I | 3845.80 | CN | 3861.55 | CN |
| 3829.66 | V II | 3846.41 | Fe I | 3862.05 | Sm II |
| 3830.03 | Cr I | 3846.80 | Fe I | 3862.59 | Si II |
| 3830.37 | CN | 3846.95 | Fe I | 3862.90 | CN |
| 3830.76 | Fe I | 3847.27 | CN | 3863.33 | Nd II |
| 3831.02 | V II | 3847.85 | CN | 3863.41 | Nd II |
| 3831.80 | Gd II | 3848.02 | Tm II | 3863.59 | CN |
| 3832.30 | Mg II | 3848.60 | Ce II | 3863.81 | V II |
| 3832.40 | CN | 3848.98 | Cr I | 3864.06 | CN |
| 3832.89 | Y II | 3849.36 | Cr I | 3864.46 | CN |
| 3833.06 | Sc II | 3849.53 | Cr I | 3865.09 | CN |
| 3833.71 | Cr I | 3850.04 | Cr I | 3865.40 | CN |
| 3833.86 | Mn I | 3850.69 | Gd II | 3865.59 | Cr II |
| 3834.22 | V I | 3850.82 | Fe I | 3866.17 | CN |
| 3834.36 | Mn I | 3851.08 | CN | 3866.56 | CN |
| 3835.39 | H9 | 3851.62 | Pr II | 3866.96 | CN |
| 3836.09 | Ti II | 3851.75 | Nd II | 3867.22 | Fe I |
| 3836.33 | Fe I | 3852.41 | CN | 3867.38 | CN |
| 3836.54 | Nd II | 3852.57 | Fe I | 3867.86 | CN |
| 3837.13 | Fe I | 3852.81 | Pr II | 3868.03 | CN |
| 3837.61 | CN | 3853.18 | Cr II | 3868.57 | CN |
| 3837.88 | CN | 3853.46 | Fe I | 3868.83 | CN |
| 3838.29 | Mg I | 3854.06 | CN | 3869.05 | Nd II |
| 3838.98 | Nd II | 3854.20 | CN | 3869.28 | Ti I |
| 3839.26 | Fe I | 3854.93 | CN | 3869.59 | Fe I |
| 3839.67 | CN | 3855.29 | Cr I | 3870.15 | CN |
| 3840.14 | V I | 3855.37 | V I | 3870.51 | Ca I |
| 3840.70 | Cr I | 3855.60 | CN | 3870.89 | CN |
| 3840.90 | CN | 3856.02 | Si II | 3871.14 | CN |
| 3841.08 | Mn I | 3856.52 | CN | 3871.54 | Gd II |
| 3841.46 | Co I | 3857.03 | Ce II | 3871.75 | Fe I |
| 3841.73 | CN | 3857.63 | Cr I | 3872.18 | CN |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3872.50 | Fe I | 3890.84 | Fe I | 3910.33 | CH |
| 3872.75 | V I | 3891.00 | Ui | 3910.81 | La II |
| 3872.98 | Fe II | 3891.39 | Zr I | 3911.17 | Nd II |
| 3873.37 | CN | 3891.78 | Ba II | 3911.32 | Cr II |
| 3874.17 | Tb II | 3892.11 | Co I | 3911.95 | Cr I |
| 3874.78 | CN | 3892.86 | V I | 3912.21 | V I |
| 3875.19 | Sm II | 3892.98 | Fe I | 3912.42 | Ce II |
| 3875.46 | Gd II | 3893.39 | Fe I | 3912.98 | Ni I |
| 3876.04 | Fe I | 3894.01 | Fe I | 3913.46 | Ti I |
| 3876.48 | CN | 3894.63 | Nd II | 3914.01 | CH |
| 3877.01 | CN | 3894.98 | Co I | 3914.33 | V II |
| 3877.51 | CN | 3895.66 | Fe I | 3914.96 | Cr I |
| 3878.02 | Fe I | 3896.15 | V II | 3915.50 | Co I |
| 3878.58 | Fe I | 3896.80 | Ce II | 3915.94 | Zr II |
| 3878.71 | V II | 3897.45 | CH | 3916.42 | V II |
| 3878.83 | CN | 3897.90 | Fe I | 3916.73 | Fe I |
| 3879.22 | Cr I | 3898.28 | V I | 3917.29 | Eu II |
| 3879.58 | CN | 3898.49 | Ti I | 3917.60 | Cr I |
| 3880.04 | CN | 3899.14 | V II | 3918.28 | Ce I |
| 3880.45 | CN | 3899.67 | Ti I | 3918.64 | Fe I |
| 3880.78 | Nd II | 3900.23 | Nd II | 3919.07 | Fe I |
| 3881.12 | CN | 3900.55 | Ti II | 3919.81 | Ce II |
| 3881.68 | CN | 3900.96 | Ti I | 3920.26 | Fe I |
| 3882.15 | Ti I | 3901.60 | CH | 3920.96 | Nd II |
| 3882.45 | Ce II | 3902.25 | V I | 3921.02 | Cr I |
| 3882.75 | CN | 3902.40 | Gd II | 3921.42 | Ti I |
| 3883.21 | V II | 3902.92 | Cr I | 3921.73 | Ce II |
| 3883.40 | CN | 3903.16 | Cr I | 3921.91 | V I |
| 3884.36 | Fe I | 3903.42 | Sm II | 3922.36 | Zr II |
| 3884.85 | V II | 3904.34 | Ce II | 3922.76 | Co I |
| 3885.22 | Cr I | 3905.53 | Si I | 3923.11 | Ce II |
| 3885.81 | Fe I | 3905.89 | Nd II | 3923.50 | Se II |
| 3886.28 | Fe I | 3906.31 | Er II | 3924.53 | Ti I |
| 3886.79 | Cr I | 3906.48 | Fe I | 3924.66 | V I |
| 3887.05 | Fe I | 3907.29 | Ce II | 3925.09 | La II |
| 3887.87 | Nd II | 3907.94 | Fe I | 3925.55 | Fe I |
| 3888.52 | Fe I | 3908.41 | Ce II | 3926.00 | Fe I |
| 3888.65 | He I | 3908.54 | Fe II | 3926.47 | Mn I |
| 3889.67 | Ni I | 3908.93 | Ni I | 3927.10 | Nd II |
| 3889.99 | Ce II | 3909.31 | Ce II | 3927.92 | Fe I |
| 3890.18 | V I | 3909.93 | Co I | 3928.08 | Fe I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3928.35 | CH | 3951.16 | Fe I | 3976.27 | Sm II |
| 3929.21 | Fe I | 3951.97 | V II | 3976.67 | Cr I |
| 3929.54 | Zr II | 3952.20 | Nd II | 3976.86 | Fe I |
| 3930.08 | Co I | 3952.61 | Fe I | 3977.08 | Mn I |
| 3930.66 | Y II | 3953.16 | Fe I | 3977.74 | Fe I |
| 3931.34 | V I | 3953.52 | Pr II | 3978.65 | Co I |
| 3931.52 | Dy II | 3953.86 | Fe I | 3978.86 | Co I |
| 3932.01 | Ti II | 3954.54 | Ni I | 3979.48 | Nd II |
| 3933.66 | Ca II | 3955.09 | Nd II | 3979.65 | Fe I |
| 3934.80 | Zr II | 3955.96 | Fe I | 3980.90 | Ce II |
| 3935.31 | Fe I | 3956.34 | Ti I | 3981.23 | Cr I |
| 3935.82 | Fe I | 3956.68 | Fe I | 3981.77 | Fe I |
| 3936.22 | La II | 3957.05 | Ca I | 3982.06 | PV II |
| 3936.56 | Fe I | 3957.93 | Co I | 3982.58 | Mn I |
| 3936.97 | W I | 3858.21 | Ti I | 3983.20 | CH |
| 3937.58 | Nd II | 3959.52 | Gd II | 3983.91 | Cr I |
| 3938.29 | Fe II | 3960.91 | Ce II | 3984.34 | Cr I |
| 3938.63 | Er II | 3961.52 | Al I | 3984.67 | Ce II |
| 3939.43 | W I | 3962.12 | Ni I | 3985.39 | Fe I |
| 3939.52 | Nd II | 3962.99 | Sm II | 3986.18 | Fe I |
| 3939.64 | Sm II | 3963.11 | Nd II | 3986.75 | Mg I |
| 3940.34 | Ce II | 3963.90 | Nd II | 3987.12 | Co I |
| 3940.88 | Fe I | 3964.27 | Ti I | 3987.98 | Yb I |
| 3941.49 | Cr I | 3964.73 | He I | 3988.83 | V I |
| 3941.73 | Co I | 3965.24 | Co I | 3989.06 | Sc II |
| 3942.44 | Fe I | 3965.83 | Fe I | 3989.80 | V II |
| 3943.24 | Sm II | 3966.63 | Fe I | 3990.10 | Nd II |
| 3943.89 | Ce II | 3967.18 | Ce II | 3990.57 | V I |
| 3944.13 | Ni I | 3969.38 | Fe II | 3991.14 | Zr II |
| 3944.76 | Fe I | 3970.07 | H7 | 3991.67 | Cr I |
| 3945.12 | Fe I | 3971.26 | Cr I | 3991.74 | Nd II |
| 3945.33 | Co I | 3971.68 | Ce II | 3992.39 | Ce II |
| 3946.18 | Ni I | 3971.98 | Eu II | 3992.80 | V I |
| 3946.68 | Ce II | 3972.27 | Nd II | 3993.21 | Gd II |
| 3947.13 | Co I | 3973.56 | Ni I | 3993.97 | Cr I |
| 3947.77 | Ti I | 3973.65 | Nd II | 3994.54 | Co I |
| 3948.28 | Fe I | 3973.98 | Gd II | 3994.68 | Ti I |
| 3948.78 | Fe I | 3974.16 | Fe II | 3995.20 | Fe I |
| 3949.10 | La II | 3974.73 | Co I | 3995.74 | La II |
| 3949.44 | Pr II | 3975.03 | Fe II | 3996.08 | Al II |
| 3950.35 | Y II | 3975.69 | Ti I | 3996.79 | Fe I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 3997.13 | V II | 4017.77 | Ti I | 4037.90 | Gd II |
| 3997.76 | Gd II | 4018.28 | Fe I | 4038.62 | Fe I |
| 3998.05 | Fe I | 4018.83 | Nd II | 4039.10 | Cr I |
| 3998.64 | Ti I | 4019.05 | V II | 4039.94 | Fe I |
| 3999.20 | V II | 4019.29 | Co I | 4040.24 | Zr II |
| 4000.02 | Fe I | 4020.40 | Sc I | 4040.76 | Ce II |
| 4000.47 | Fe I | 4020.87 | Nd II | 4041.29 | Fe I |
| 4001.17 | V II | 4021.33 | Nd II | 4041.66 | Fe I |
| 4002.07 | Fe II | 4021.81 | Ti I | 4042.58 | Ce II |
| 4002.55 | Fe II | 4022.26 | Cr I | 4042.90 | Sm II |
| 4002.94 | V II | 4022.74 | Fe I | 4043.60 | Nd II |
| 4003.76 | Fe I | 4023.00 | Nd II | 4043.90 | Fe I |
| 4003.79 | Ti I | 4023.40 | Co I | 4044.61 | Fe I |
| 4004.01 | Nd II | 4023.99 | Ni I | 4045.15 | Gd II |
| 4004.83 | Fe I | 4024.49 | Ce II | 4045.39 | Co I |
| 4004.98 | Fe I | 4024.73 | Fe I | 4045.82 | Fe I |
| 4005.38 | Fe I | 4025.14 | Ni I | 4046.34 | Ce II |
| 4005.95 | Ti I | 4025.87 | La II | 4046.76 | Ni I |
| 4006.31 | Fe I | 4026.17 | Cr I | 4047.32 | Fe I |
| 4006.77 | Fe I | 4026.44 | Mn I | 4048.68 | Zr II |
| 4007.00 | CH | 4027.10 | Cr I | 4049.03 | V II |
| 4007.44 | Nd II | 4027.67 | Ni I | 4049.43 | Gd II |
| 4008.09 | Sm II | 4027.94 | CH | 4049.86 | Gd II |
| 4008.71 | Pr II | 4028.41 | Ce II | 4050.32 | Zr II |
| 4008.93 | Ti I | 4029.64 | Fe I | 4051.06 | V II |
| 4009.16 | Er II | 4029.68 | Zr II | 4051.34 | V II |
| 4009.71 | Fe I | 4030.47 | Nd II | 4051.92 | Fe I |
| 4010.18 | Fe I | 4030.76 | Mn I | 4052.31 | Fe I |
| 4010.77 | Fe I | 4031.24 | Fe I | 4052.47 | Mn I |
| 4011.42 | Fe I | 4031.68 | La II | 4052.93 | Ti I |
| 4012.37 | Ti I | 4031.97 | Fe I | 4053.29 | Gd II |
| 4012.50 | Cr II | 4032.46 | Fe I | 4053.81 | Ti I |
| 4013.64 | Fe I | 4032.95 | Fe II | 4054.18 | Fe I |
| 4013.94 | Co I | 4033.55 | Sb I | 4054.85 | Pr II |
| 4014.53 | Fe I | 4033.88 | Ti I | 4055.05 | Fe I |
| 4014.90 | Ce II | 4034.23 | CH | 4055.54 | Mn I |
| 4015.39 | Pr II | 4034.88 | Ti I | 4056.35 | Fe I |
| 4015.88 | Ce II | 4035.63 | V II | 4056.54 | Pr II |
| 4016.09 | Ca I | 4035.83 | Ti I | 4057.20 | Co I |
| 4016.82 | V II | 4036.78 | V II | 4057.50 | Mg I |
| 4017.56 | Ni I | 4037.72 | Fe I | 4057.81 | Pb I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4058.18 | Co I | 4076.64 | Fe Ⅰ | 4086.72 | La Ⅱ |
| 4058.60 | Co I | 4076.71 | La Ⅱ | 4087.10 | Fe Ⅰ |
| 4058.93 | Mn I | 4076.89 | Fe Ⅰp | 4087.30 | Ce Ⅱ |
| 4059.22 | CH | 4077.05 | Zr Ⅱ | 4087.71 | CN |
| 4059.73 | Fe I | 4077.35 | La Ⅱ | 4087.79 | Fe Ⅰp |
| 4059.96 | Nd II | 4077.38 | Y Ⅰ | 4088.57 | Fe Ⅰ |
| 4060.26 | Ti I | 4077.41 | Ce Ⅱ | 4088.90 | Cr Ⅱ |
| 4060.77 | Fe I | 4077.71 | Sr Ⅱ | 4089.23 | Fe Ⅰ |
| 4061.74 | Mn I | 4077.97 | Dy Ⅱ | 4089.94 | Mn Ⅰ |
| 4062.45 | Fe I | 4078.36 | Fe Ⅰ | 4090.08 | Fe Ⅰ |
| 4062.82 | Pr II | 4078.44 | Gd Ⅱ | 4090.52 | Zr Ⅱ |
| 4063.29 | Fe I | 4078.47 | Ti Ⅰ | 4090.58 | V Ⅰ |
| 4063.59 | Gd II | 4079.18 | Fe Ⅰp | 4090.95 | Co Ⅱ |
| 4064.20 | Ti I | 4079.24 | Mn Ⅰ | 4090.98 | Fe Ⅰ |
| 4064.37 | Ni I | 4079.42 | Mn Ⅰ | 4091.56 | Fe Ⅰ |
| 4064.58 | Sm II | 4079.73 | Nb Ⅰ | 4092.39 | Co Ⅰ |
| 4065.07 | V II | 4079.71 | Ti Ⅰ | 4092.51 | Fe Ⅰ |
| 4065.40 | Fe I | 4079.85 | Fe Ⅰ | 4092.63 | Ca Ⅰ |
| 4065.72 | Cr I | 4080.23 | Fe Ⅰ | 4092.69 | V Ⅰ |
| 4066.60 | Fe I | 4080.23 | Nd Ⅱ | 4092.85 | Co Ⅰ |
| 4066.98 | Fe I | 4080.44 | Ce Ⅱ | 4093.16 | Hf Ⅱ |
| 4067.28 | Fe I | 4080.60 | Ru Ⅰ | 4093.90 | Mg Ⅱ |
| 4067.85 | Fe I | 4080.89 | Fe Ⅰ | 4094.27 | Zr Ⅰ |
| 4068.54 | Co I | 4081.22 | Ce Ⅱ | 4094.48 | Gd Ⅱ |
| 4068.84 | Ce II | 4082.13 | Fe Ⅰ | 4094.70 | CH |
| 4069.27 | Nd II | 4082.30 | Cr Ⅱ | 4094.93 | Ca Ⅰ |
| 4070.28 | Mn I | 4082.40 | Sc Ⅰ | 4095.36 | Fe Ⅰ |
| 4070.77 | Fe I | 4082.44 | Fe Ⅰ | 4095.49 | V Ⅰ |
| 4071.09 | Zr II | 4082.46 | Ti Ⅰ | 4095.98 | Fe Ⅰ |
| 4071.52 | Fe I | 4082.60 | Sm Ⅱ | 4096.12 | Fe Ⅰ |
| 4071.81 | Ce II | 4082.94 | Mn Ⅰ | 4096.63 | Zr Ⅱ |
| 4072.52 | Fe I | 4083.23 | Ce Ⅱ | 4096.82 | Pr Ⅱ |
| 4072.92 | Ce II | 4083.55 | Fe Ⅰ | 4096.96 | Fe Ⅰp |
| 4073.13 | Dy II | 4083.63 | Mn Ⅰ | 4097.10 | Fe Ⅰ |
| 4073.76 | Gd II | 4083.78 | Fe Ⅰ | 4097.65 | Cr Ⅰ |
| 4074.36 | Ti II | 4084.50 | Fe Ⅰ | 4097.96 | Cr Ⅰ |
| 4074.79 | Fe I | 4084.68 | Gd Ⅱ | 4098.18 | Cr Ⅰ |
| 4075.12 | Nd II | 4085.01 | Fe Ⅰ | 4098.18 | Fe Ⅰ |
| 4075.71 | Ce II | 4085.31 | Fe Ⅰ | 4098.44 | Cr Ⅱ |
| 4075.95 | Fe I | 4085.56 | Gd Ⅱ | 4098.53 | Ca Ⅰ |
| 4076.50 | Fe I | 4085.68 | Zr Ⅱ | 4098.90 | Gd Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4058.18 | Co I | 4101.74 | H6 | 4112.04 | Eu II |
| 4058.60 | Co I | 4102.38 | Y I | 4112.35 | Fe I |
| 4058.93 | Mn I | 4102.62 | CN | 4112.71 | Ti I |
| 4059.22 | CH | 4102.93 | Si I | 4112.97 | Fe I |
| 4059.73 | Fe I | 4103.32 | Dy II | 4113.24 | Cr II |
| 4059.96 | Nd II | 4103.62 | Fe I p | 4113.73 | Ce II |
| 4060.26 | Ti I | 4104.13 | Fe I | 4113.83 | Nd II |
| 4060.77 | Fe I | 4104.13 | Fe I | 4113.88 | Mn I |
| 4061.74 | Mn I | 4104.18 | Fe II p | 4114.15 | Ce II |
| 4062.45 | Fe I | 4104.46 | Fe I p | 4114.45 | Fe I |
| 4062.82 | Pr II | 4104.87 | C r I | 4114.96 | Fe I |
| 4063.29 | Fe I | 4105.00 | Ce II | 4115.18 | V I |
| 4063.59 | Gd II | 4105.17 | V I | 4115.37 | Ce II |
| 4064.20 | Ti I | 4105.36 | Mn I | 4115.89 | Fe I p |
| 4064.37 | Ni I | 4105.72 | CN | 4116.21 | CN |
| 4064.58 | Sm II | 4106.27 | Fe I | 4116.47 | V I |
| 4065.07 | V II | 4106.44 | Fe I | 4116.70 | V I |
| 4065.40 | Fe I | 4106.71 | Cr I | 4116.71 | TR II |
| 4065.72 | Cr I | 4106.88 | Ce II | 4116.97 | Fe I |
| 4066.60 | Fe I | 4107.39 | Sm II | 4117.29 | Ce II |
| 4066.98 | Fe I | 4107.49 | Fe I | 4117.59 | Ce II |
| 4067.28 | Fe I | 4107.78 | C H | 4117.71 | Fe I |
| 4067.85 | Fe I | 4108.13 | Fe I p | 4117.87 | Fe I |
| 4068.54 | Co I | 4108.31 | Fe I p | 4117.87 | Fe I |
| 4068.84 | Ce II | 4108.55 | Ca I | 4118.14 | Ce II |
| 4069.27 | Nd II | 4109.07 | Fe I | 4118.48 | Pr II |
| 4070.28 | Mn I | 4109.07 | Nd II | 4118.55 | Sm II |
| 4070.77 | Fe I | 4109.46 | Nd II | 4118.55 | Fe I |
| 4071.09 | Zr II | 4109.79 | V I | 4118.77 | Co I |
| 4071.52 | Fe I | 4109.81 | Fe I | 4118.90 | Fe I |
| 4071.81 | Ce II | 4109.98 | Cr I | 4119.02 | Ce II |
| 4072.52 | Fe I | 4110.38 | Ce II | 4119.40 | Fe I |
| 4072.92 | Ce II | 4110.47 | Nd II | 4119.78 | Ce II |
| 4098.98 | Dy II | 4110.53 | Co I | 4119.88 | Ce II |
| 4099.17 | Gd II | 4110.87 | C r I | 4120.04 | Ti I |
| 4099.54 | Ti II | 4110.90 | Mn I | 4120.21 | Fe I |
| 4099.80 | Fe I | 4111.01 | Cr II | 4120.65 | Nd II |
| 4100.17 | Nd II | 4111.01 | Cr II | 4120.81 | He I |
| 4100.75 | Ce II | 4111.39 | Ce II | 4120.83 | Ce II |
| 4100.75 | Fe I | 4111.78 | V I | 4121.32 | Co I |
| 4100.91 | Fe I | 4111.90 | Fe II | 4121.36 | Sm II |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4121.64 | Ti I | 4131.10 | Ce II | 4141.06 | Mn Ⅰ |
| 4121.81 | Fe I | 4131.24 | Ti I | 4141.26 | Pr Ⅱ |
| 4121.82 | Cr I | 4131.36 | Cr I | 4141.73 | La Ⅱ |
| 4122.00 | Fe I p | 4131.97 | Fe I p | 4141.86 | Fe Ⅰ |
| 4122.14 | Ti I | 4132.06 | Fe I | 4142.32 | Ni Ⅰ |
| 4122.64 | Fe II | 4132.28 | Gd II | 4142.40 | Ce Ⅱ |
| 4122.76 | Mn I | 4132.54 | Fe I p | 4142.90 | V Ⅱ |
| 4123.23 | La II | 4132.90 | Fe I | 4143.05 | Ti Ⅰ |
| 4123.56 | Ti I | 4133.36 | Nd II | 4143.14 | Pr Ⅱ |
| 4123.57 | V I | 4133.80 | Ce II | 4143.28 | Ti Ⅰ |
| 4123.75 | Fe I | 4133.80 | Ce II | 4143.42 | Fe Ⅰ |
| 4123.75 | Fe I | 4133.87 | Fe I | 4143.77 | La Ⅱ |
| 4123.87 | Ce II | 4134.19 | Fe I p | 4143.83 | Fe Ⅰp |
| 4123.96 | Sm II | 4134.43 | Fe I | 4143.87 | Fe Ⅰ |
| 4124.79 | Fe II | 4134.43 | Fe I | 4144.16 | Ru Ⅰ |
| 4124.91 | Y II | 4134.49 | V I | 4144.23 | CN |
| 4125.62 | Fe II | 4134.68 | Fe I | 4144.49 | Ce Ⅱ |
| 4125.78 | Ce II | 4135.04 | Mn I | 4144.76 | CN |
| 4125.88 | Fe I | 4135.33 | Nd II | 4145.00 | Ce Ⅱ |
| 4126.19 | Fe I | 4135.44 | Ce II | 4145.21 | Fe Ⅰ |
| 4126.52 | C r I | 4135.68 | Zr I | 4145.77 | Cr Ⅱ |
| 4126.88 | Fe I | 4135.77 | Fe I | 4146.07 | Fe Ⅰ |
| 4127.37 | Ce II | 4136.51 | Fe I | 4146.20 | Cr Ⅰ |
| 4127.53 | Ti I | 4137.00 | Fe I | 4146.23 | Ce Ⅱ |
| 4127.61 | Fe I | 4137.10 | Gd II | 4146.70 | Cr Ⅰ |
| 4127.81 | Fe I | 4137.26 | Mn I | 4147.26 | Fe Ⅱp |
| 4127.81 | Fe I | 4137.28 | Ti I | 4147.53 | Mn Ⅰ |
| 4128.07 | V I | 4137.42 | Fe Ⅰp | 4147.67 | Fe Ⅰ |
| 4128.14 | Mn II | 4137.65 | Ce Ⅱ | 4147.86 | Unrd |
| 4128.73 | Fe II | 4137.97 | Fe Ⅰp | 4148.04 | Unrd |
| 4129.21 | Cr I | 4138.40 | Fe Ⅱp | 4148.40 | CN |
| 4129.22 | Fe I | 4138.76 | CN | 4148.72 | Th Ⅰ |
| 4129.23 | Sm II | 4138.99 | CN | 4148.80 | Mn Ⅰ |
| 4129.46 | Fe Ip | 4139.45 | Co Ⅰ | 4149.22 | Er Ⅱ |
| 4129.73 | Eu II | 4139.48 | Ti Ⅰ | 4149.45 | Cr Ⅰ |
| 4130.04 | Fe I | 4139.93 | Fe Ⅰ | 4149.45 | Ti Ⅰ |
| 4130.04 | Fe I | 4140.24 | Fe Ⅰp | 4149.76 | Fe Ⅰp |
| 4130.37 | Gd II | 4140.44 | Fe Ⅰ | 4149.94 | Ce Ⅱ |
| 4130.37 | Gd II | 4140.44 | Fe Ⅰ | 4149.94 | Ce Ⅱ |
| 4130.65 | Ba II | 4140.45 | Gd Ⅱ | 4150.26 | Fe Ⅰ |
| 4130.71 | Ce II | 4140.76 | CN | 4150.37 | Ni Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4150.81 | Ti Ⅰ | 4159.03 | Ce Ⅱ | 4167.86 | Fe Ⅰ |
| 4150.96 | Ti Ⅰ | 4159.19 | CH | 4168.62 | Fe Ⅰ |
| 4150.97 | Zr Ⅱ | 4159.24 | CH | 4168.94 | Fe Ⅰ |
| 4151.52 | Eu Ⅱ | 4159.63 | Cr Ⅰ | 4169.33 | Ti Ⅰ |
| 4151.79 | Fe Ⅱp | 4159.63 | Ti Ⅰ | 4169.78 | Fe Ⅰ |
| 4151.96 | Fe Ⅰ | 4159.86 | CN | 4169.84 | Cr Ⅰ |
| 4151.97 | Ce Ⅱ | 4160.25 | CN | 4170.11 | Gd Ⅱ |
| 4151.98 | La Ⅱ | 4160.36 | Fe Ⅰ | 4170.49 | CN |
| 4152.17 | Fe Ⅰ | 4160.56 | Fe Ⅰ | 4170.91 | Fe Ⅰ |
| 4152.32 | CN | 4161.18 | Ce Ⅱ | 4171.02 | Ti Ⅰ |
| 4152.58 | Nb Ⅰ | 4161.20 | Zr Ⅱ | 4171.68 | Cr Ⅰ |
| 4152.78 | Cr Ⅰ | 4161.49 | Fe Ⅰ | 4171.90 | Ti Ⅱ |
| 4152.78 | La Ⅱ | 4161.52 | Ti Ⅱ | 4171.90 | Fe Ⅰ |
| 4153.33 | Sm Ⅱ | 4161.80 | Sr Ⅱ | 4172.13 | Fe Ⅰ |
| 4153.39 | CH | 4162.29 | CN | 4172.48 | CH |
| 4153.82 | Cr Ⅰ | 4162.46 | CH | 4172.60 | Cr Ⅱ |
| 4153.82 | Cr Ⅰ | 4162.67 | CN | 4172.61 | Ti Ⅰ |
| 4153.91 | Fe Ⅰ | 4162.96 | CN | 4172.64 | Fe Ⅰ |
| 4154.11 | Fe Ⅰ | 4163.26 | CN | 4172.75 | Fe Ⅰ |
| 4154.50 | Fe Ⅰ | 4163.48 | CN | 4173.32 | Fe Ⅰ |
| 4154.81 | Fe Ⅰ | 4163.63 | Cr Ⅰ | 4173.45 | Fe Ⅱ |
| 4154.86 | Ti Ⅰ | 4163.63 | Cr Ⅰ | 4173.54 | Ti Ⅱ |
| 4154.86 | Gd Ⅱ | 4163.64 | Ti Ⅱ | 4173.56 | Gd Ⅱ |
| 4155.22 | Sm Ⅱ | 4164.02 | V Ⅱ | 4173.93 | Fe Ⅰ |
| 4155.22 | Sm Ⅱ | 4164.24 | Fe Ⅰp | 4174.31 | Mn Ⅱp |
| 4155.52 | Mn Ⅰ | 4164.33 | CH | 4174.42 | Fe Ⅰ |
| 4155.53 | Ce Ⅱ | 4164.66 | Nb Ⅰ | 4174.80 | Cr Ⅰ |
| 4155.92 | Fe Ⅰ | 4164.64 | Ni Ⅰ | 4174.92 | Fe Ⅰ |
| 4156.08 | Nd Ⅱ | 4164.79 | FeⅢ | 4174.94 | Cr Ⅰ |
| 4156.24 | Zr Ⅱ | 4164.80 | Fe Ⅰ | 4175.13 | CH |
| 4156.46 | Fe Ⅰ | 4165.12 | Mg Ⅰ | 4175.13 | CN |
| 4156.67 | Fe Ⅰ | 4165.39 | CN | 4175.61 | Nd Ⅱ |
| 4156.80 | Fe Ⅰ | 4165.61 | Ce Ⅱ | 4175.64 | Fe Ⅰ |
| 4157.00 | Mn Ⅰ | 4166.00 | Ba Ⅱ | 4175.89 | Fe Ⅰp |
| 4157.58 | Nd Ⅱ | 4166.31 | Ti Ⅰ | 4175.94 | Cr Ⅰ |
| 4157.79 | Fe Ⅰ | 4166.86 | FeⅢ | 4176.44 | Fe Ⅱp |
| 4158.01 | CH | 7167.03 | CN | 4176.51 | Fe Ⅰ |
| 4158.08 | CN | 4167.26 | Mg Ⅰ | 4176.57 | Fe Ⅰp |
| 4158.42 | Co Ⅰ | 4167.57 | CH | 4176.99 | CN |
| 4158.45 | Fe Ⅱp | 4167.80 | Cr Ⅰ | 4177.32 | Nd Ⅱ |
| 4158.80 | Fe Ⅰ | 4167.80 | Ce Ⅱ | 4177.54 | Y Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4177.60 | Fe Ⅰ | 4188.10 | Gd Ⅱ | 4196.68 | Fe Ⅰ |
| 4177.70 | Fe Ⅱp | 4188.13 | Sm Ⅱ | 4196.88 | CN |
| 4177.85 | CH | 4188.32 | CN | 4197.10 | CN |
| 4177.85 | CN | 4188.74 | Fe Ⅰ | 4197.10 | Fe Ⅰp |
| 4178.00 | CH | 4188.98 | Ni Ⅰ | 4197.68 | Gd Ⅱ |
| 4178.02 | Sm Ⅱ | 4189.10 | CH | 4198.07 | Fe Ⅰ |
| 4178.39 | V Ⅱ | 4189.56 | Fe Ⅰ | 4198.27 | Fe Ⅰ |
| 4178.85 | Fe Ⅱ | 4190.13 | CN | 4198.31 | Fe Ⅰ |
| 4179.23 | Co Ⅰ | 4190.16 | Cr Ⅰ | 4198.64 | CH |
| 4179.42 | V Ⅰ | 4190.29 | Ti Ⅱ | 4198.64 | Fe Ⅰ |
| 4179.42 | Pr Ⅱ | 4190.40 | V Ⅱ | 4198.67 | Ce Ⅱ |
| 4179.43 | Cr Ⅱ | 4190.71 | Co Ⅰ | 4198.72 | Ce Ⅱ |
| 4179.59 | Nd Ⅱ | 4191.07 | Gd Ⅱ | 4199.10 | Nd Ⅱ |
| 4179.81 | Zr Ⅱ | 4191.44 | Fe Ⅰ | 4199.10 | Fe Ⅰ |
| 4180.00 | CN | 4191.68 | Fe Ⅰ | 4199.27 | Ni Ⅰ |
| 4180.41 | Fe Ⅰp | 4191.75 | Cr Ⅰ | 4199.83 | CH |
| 4180.81 | CN | 4192.02 | CN | 4199.97 | Fe Ⅰ |
| 4181.10 | Sm Ⅱ | 4192.02 | CH | 4200.46 | Ni Ⅰ |
| 4181.20 | Fe Ⅰp | 4192.10 | Cr Ⅰ | 4200.60 | CH |
| 4181.55 | Fe Ⅰp | 4192.40 | CN | 4200.93 | Fe Ⅰ |
| 4181.76 | Fe Ⅰ | 4192.57 | CH | 4201.07 | Ca Ⅰ |
| 4182.22 | CN | 4192.86 | Co Ⅰ | 4201.50 | La Ⅱ |
| 4182.38 | Fe Ⅰp | 4193.09 | Ce Ⅱ | 4201.73 | Fe Ⅰ |
| 4182.79 | Fe Ⅰ | 4193.46 | CN | 4202.03 | Fe Ⅰ |
| 4183.02 | Fe Ⅰ | 4193.66 | Cr Ⅰ | 4202.15 | Ni Ⅰ |
| 4183.20 | Fe Ⅱp | 4193.81 | CN | 4202.35 | V Ⅱ |
| 4183.43 | V Ⅱ | 4193.89 | Cr Ⅰ | 4202.76 | Fe Ⅰ |
| 4184.00 | Fe Ⅰ | 4194.36 | La Ⅱ | 7202.76 | Fe Ⅰ |
| 4184.25 | Gd Ⅱ | 4194.50 | Fe Ⅰp | 4202.94 | Ce Ⅱ |
| 4184.33 | Ti Ⅱ | 4194.71 | CH | 4203.05 | Sm Ⅱ |
| 4184.90 | Fe Ⅰ | 4194.95 | Cr Ⅰ | 4203.57 | Fe Ⅰ |
| 4184.90 | Cr Ⅰ | 4195.00 | CN | 4203.59 | Cr Ⅰ |
| 4185.34 | Cr Ⅰ | 4195.34 | Fe Ⅰ | 4203.99 | Fe Ⅰ |
| 4185.78 | Fe Ⅰ | 4195.53 | Ni Ⅰ | 4204.03 | La Ⅱ |
| 4186.12 | Ti Ⅰ | 4195.61 | Fe Ⅰ | 4204.19 | Cr Ⅰ |
| 4186.34 | CN | 4195.63 | CN | 4204.20 | V Ⅱ |
| 4186.60 | Ce Ⅱ | 4195.95 | CN | 4204.47 | Cr Ⅰ |
| 4187.04 | Fe Ⅰ | 4196.34 | Ce Ⅱ | 4204.69 | Y Ⅱ |
| 4187.26 | CN | 4196.42 | CN | 4204.86 | Gd Ⅱ |
| 4187.59 | Fe Ⅰ | 4196.53 | Fe Ⅰ | 4205.05 | Eu Ⅱ |
| 4187.80 | Fe Ⅰ | 4196.55 | La Ⅱ | 4205.08 | V Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4205.55 | Fe Ⅰ | 4215.52 | Sr Ⅱ | 4224.85 | Cr Ⅱ |
| 4205.60 | Nd Ⅱ | 4215.98 | Fe Ⅰ | 4224.86 | CH |
| 4206.13 | Sm Ⅱ | 4215.98 | CN | 4225.15 | Gd Ⅱ |
| 4206.70 | Fe Ⅰ | 4216.19 | Fe Ⅰ | 4225.23 | V Ⅱ |
| 4206.74 | Pr Ⅱ | 4216.60 | CH | 4225.33 | Pr Ⅱ |
| 4207.13 | Fe Ⅰ | 4217.07 | Cr Ⅱ | 4225.33 | Sm Ⅱ |
| 4207.41 | CH | 4217.20 | Gd Ⅱ | 4225.46 | Fe Ⅰ |
| 4208.17 | CN | 4217.21 | CH | 4225.59 | Pr Ⅱ |
| 4208.61 | Fe Ⅰ | 4217.27 | CH | 4225.59 | Sc Ⅰ |
| 4208.61 | Fe Ⅰ | 4217.27 | Nd Ⅱ | 4225.79 | Fe Ⅰp |
| 4208.99 | Zr Ⅱ | 4217.55 | Fe Ⅰ | 4225.96 | Fe Ⅰ |
| 4209.02 | Cr Ⅱ | 4217.56 | La Ⅱ | 4226.43 | Fe Ⅰ |
| 4209.41 | Ce Ⅱ | 4217.63 | Cr Ⅰ | 4226.57 | Ge Ⅰ |
| 4209.74 | V Ⅱ | 4218.21 | Fe Ⅰp | 4226.73 | Ca Ⅰ |
| 4209.76 | Cr Ⅰ | 4218.39 | CH | 4227.14 | Gd Ⅱ |
| 4209.86 | V Ⅰ | 4218.73 | CH | 4227.34 | Ti Ⅱp |
| 4210.06 | CN | 4219.36 | Fe Ⅰ | 4227.42 | Fe Ⅰp |
| 4210.35 | Fe Ⅰ | 4220.05 | V Ⅱ | 4227.43 | Fe Ⅰ |
| 4210.35 | Sm Ⅱ | 4220.05 | Fe Ⅰp | 4227.72 | Nd Ⅱ |
| 4210.62 | CN | 4220.14 | Sm Ⅱ | 4227.73 | Cr Ⅱ |
| 4210.97 | CH | 4220.26 | Nd Ⅱ | 4227.75 | Ce Ⅱ |
| 4211.29 | Nd Ⅱ | 4220.35 | Fe Ⅰ | 4227.94 | CH |
| 4211.35 | Cr Ⅰ | 4220.45 | Cr Ⅰ | 4228.03 | Nd Ⅱ |
| 4211.73 | Ti Ⅰ | 4220.66 | Sm Ⅱ | 4228.71 | Fe Ⅰp |
| 4211.88 | Zr Ⅱ | 4220.66 | Sm Ⅱ | 4229.52 | Fe Ⅰ |
| 4212.00 | Gd Ⅱ | 4221.17 | Ce Ⅱ | 4229.52 | Fe Ⅰ |
| 4212.23 | CN | 4221.46 | CH | 4229.70 | Sm Ⅱ |
| 4212.64 | CH | 4221.57 | Cr Ⅰ | 4229.76 | Fe Ⅰ |
| 4213.04 | Ce Ⅱ | 4221.59 | Cr Ⅰ | 4229.78 | CH |
| 4213.16 | CN | 4222.22 | Fe Ⅰ | 4229.80 | Gd Ⅱ |
| 4213.18 | Cr Ⅰ | 4222.60 | Ce Ⅱ | 4230.29 | Cr Ⅰ |
| 4213.65 | Fe Ⅰ | 4222.73 | Cr Ⅰ | 4230.48 | Cr Ⅰ |
| 4213.66 | CN | 4222.98 | Pr Ⅱ | 4230.95 | La Ⅱ |
| 4213.66 | CH | 4223.09 | CH | 4231.03 | CH |
| 4214.04 | Ce Ⅱ | 4223.49 | CH | 4231.04 | Ni Ⅰ |
| 4214.36 | CN | 4223.57 | CH | 4231.53 | Fe Ⅰ |
| 4214.63 | CN | 4224.18 | Fe Ⅰ | 4231.61 | CH |
| 4214.92 | CN | 4224.27 | Zr Ⅱ | 4231.64 | Zr Ⅱ |
| 4215.17 | CN | 4224.51 | Fe Ⅰ | 4231.95 | Nb Ⅰ |
| 4215.30 | CN | 4224.51 | V Ⅱ | 4232.38 | Nd Ⅱ |
| 4215.43 | Fe Ⅰ | 4224.51 | Cr Ⅰ | 4232.43 | Hf Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4232.72 | Fe Ⅰ | 4243.37 | Fe Ⅰ | 4253.93 | Fe Ⅰp |
| 4233.17 | Fe Ⅱ | 4243.45 | CH | 4254.35 | Cr Ⅰ |
| 4233.25 | Cr Ⅱ | 4243.53 | Pr Ⅱ | 4254.41 | V Ⅱ |
| 4233.61 | Fe Ⅰ | 4243.79 | Fe Ⅰ | 4254.94 | Fe Ⅰ |
| 4234.00 | Co Ⅰ | 4244.34 | CH | 4254.94 | Fe Ⅰ |
| 4234.00 | V Ⅰ | 4244.70 | Sm Ⅱ | 4255.25 | CH |
| 4234.20 | Nd Ⅱ | 4245.26 | Fe Ⅰ | 4255.50 | Cr Ⅰ |
| 4234.55 | V Ⅱ | 4245.36 | Fe Ⅰ | 4255.50 | Fe Ⅰ |
| 4234.57 | Sm Ⅱ | 4245.84 | Hf Ⅱ | 4255.64 | CH |
| 4235.14 | Mn Ⅰ | 4245.98 | Ce Ⅱ | 4255.84 | CH |
| 4235.29 | Mn Ⅰ | 4246.09 | Fe Ⅰ | 4256.03 | Ti Ⅰ |
| 4235.73 | Y Ⅱ | 4246.71 | Ce Ⅱ | 4256.21 | Fe Ⅰ |
| 4235.94 | Fe Ⅰ | 4246.83 | Sc Ⅱ | 4256.39 | Sm Ⅱ |
| 4236.12 | CH | 4247.29 | Fe Ⅰp | 4256.79 | Fe Ⅰ |
| 4236.26 | CH | 4247.37 | Nd Ⅱ | 4257.02 | V Ⅱ |
| 4236.75 | Sm Ⅱ | 4247.43 | Fe Ⅰ | 4257.37 | Cr Ⅰ |
| 4236.96 | CH | 4247.56 | CH | 4257.66 | Mn Ⅰ |
| 4237.08 | Fe Ⅰ | 4248.23 | Fe Ⅰ | 4258.05 | Zr Ⅱ |
| 4237.16 | Fe Ⅰ | 4248.40 | Fe Ⅰp | 4258.16 | Fe Ⅱ |
| 4237.79 | Ti Ⅰ | 4248.41 | CH | 4258.32 | Fe Ⅰp |
| 4238.03 | Fe Ⅰ | 4248.63 | CH | 4258.52 | Ti Ⅰ |
| 4238.03 | Fe Ⅰ | 4248.68 | Ce Ⅱ | 4258.62 | Fe Ⅰ |
| 4238.38 | La Ⅱ | 4248.73 | CH | 4258.96 | Fe Ⅰ |
| 4238.82 | Fe Ⅰ | 4248.94 | CH | 4259.10 | CH |
| 4238.96 | Cr Ⅰ | 4249.49 | CH | 4259.20 | MN Ⅰ Ⅰ |
| 4239.36 | Fe Ⅰp | 4249.64 | CH | 4259.31 | V Ⅰ |
| 4239.60 | CH | 4250.13 | Fe Ⅰ | 4259.99 | Fe Ⅰ |
| 4239.72 | Mn Ⅰ | 4250.69 | Mo Ⅱ | 4260.14 | Fe Ⅰ |
| 4239.73 | Fe Ⅰ | 4250.79 | Fe Ⅰ | 4260.48 | Fe Ⅰ |
| 4239.85 | Fe Ⅰ | 4250.90 | Fe Ⅰp | 4260.73 | Fe Ⅰp |
| 4239.85 | Fe Ⅰ | 4251.33 | CH | 4260.74 | Ti Ⅰ |
| 4240.37 | Fe Ⅰ | 4251.62 | Ti Ⅰ | 4260.75 | V Ⅱ |
| 4240.46 | Ca Ⅰ | 4251.77 | Ti Ⅰ | 4260.75 | V Ⅱ |
| 4240.71 | Cr Ⅰ | 4251.73 | Gd Ⅱ | 4261.22 | CH |
| 4240.71 | Cr Ⅰ | 4252.11 | Ni Ⅰ | 4261.53 | CH |
| 4241.02 | Pr Ⅱ | 4252.30 | Co Ⅰ | 4261.74 | CH |
| 4241.11 | Fe Ⅰ | 4252.44 | Nd Ⅱ | 4261.92 | Cr Ⅱ |
| 4242.16 | CH | 4252.62 | Cr Ⅱ | 4262.09 | Gd Ⅱ |
| 4242.38 | Cr Ⅱ | 4253.36 | Ce Ⅱ | 4262.38 | Cr Ⅰ |
| 4242.59 | Fe Ⅰ | 4253.37 | Gd Ⅱ | 4262.59 | CH |
| 4243.20 | CH | 4253.61 | Gd Ⅱ | 4263.13 | Ti Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4263.14 | Cr Ⅰ | 4273.48 | CH | 4281.37 | Ti Ⅰ |
| 4263.43 | Ce Ⅱ | 4273.52 | Zr Ⅱ | 4281.97 | CH |
| 4263.59 | La Ⅱ | 4273.87 | Fe Ⅰ | 4282.41 | Fe Ⅰ |
| 4263.84 | V Ⅱ | 4273.89 | CH | 4282.44 | Pr Ⅱ |
| 4264.21 | Fe Ⅰ | 4274.19 | CH | 4282.57 | Nd Ⅱ |
| 4264.37 | Ce Ⅱ | 4274.58 | Ti Ⅰ | 4282.70 | Ti Ⅰ |
| 4264.74 | Fe Ⅰ | 4274.58 | Ti Ⅰ | 4283.01 | Ca Ⅰ |
| 4265.08 | Sm Ⅱ | 4274.80 | Cr Ⅰ | 4284.21 | Cr Ⅱ |
| 4265.26 | Fe Ⅰ | 4274.96 | CH | 4284.42 | Fe Ⅰ |
| 4265.26 | Fe Ⅰ | 4275.39 | CH | 4284.52 | Nd Ⅱ |
| 4265.27 | Ti Ⅰ | 4275.56 | Ce Ⅱ | 4284.68 | Ni Ⅰ |
| 4265.92 | Mn Ⅰ | 4275.57 | Cr Ⅱ | 4284.84 | CH |
| 4266.72 | Nd Ⅱ | 4275.64 | La Ⅱ | 4284.99 | Ti Ⅰ |
| 4266.74 | CH | 4276.44 | Ti Ⅰ | 4285.45 | Fe Ⅰ |
| 4266.97 | Fe Ⅰ | 4276.66 | Ti Ⅰ | 4285.50 | Sm Ⅱ |
| 4267.39 | CH | 4276.68 | Fe Ⅰ | 4285.54 | CH |
| 4267.75 | CH | 4276.96 | V Ⅰ | 4285.83 | Fe Ⅰ |
| 4267.83 | Fe Ⅰ | 4277.37 | Zr Ⅱ | 4286.01 | Ti Ⅰ |
| 4268.03 | Co Ⅰ | 4277.54 | CH | 4286.09 | CH |
| 4268.64 | V Ⅰ | 4277.68 | Fe Ⅰ | 4286.44 | Fe Ⅰ |
| 4268.73 | Gd Ⅱ | 4278.13 | Fe Ⅱ | 4286.48 | CH |
| 4268.74 | Fe Ⅰ | 4278.23 | Fe Ⅰ | 4286.59 | CH |
| 4268.79 | Cr Ⅰ | 4278.23 | Ti Ⅰ | 4286.97 | La Ⅱ |
| 4269.28 | Cr Ⅱ | 4278.83 | Ti Ⅰ | 4286.98 | Fe Ⅰ |
| 4269.50 | La Ⅱ | 4278.85 | CH | 4287.41 | Ti Ⅰ |
| 4269.74 | CH | 4279.02 | Mo Ⅱ | 4287.89 | Ti Ⅱ |
| 4269.74 | Fe Ⅰ | 4279.48 | Fe Ⅰ | 4288.00 | Ni Ⅰ |
| 4269.85 | CH | 4279.49 | CH | 4288.15 | Fe Ⅰ |
| 4269.87 | Fe Ⅰp | 4279.72 | CH | 4288.16 | Ti Ⅰ |
| 4270.14 | Ti Ⅰ | 4279.86 | Fe Ⅰ | 4288.16 | Ti Ⅰ |
| 4270.19 | Ce Ⅱ | 4279.93 | Sc Ⅱ | 4288.74 | CH |
| 4270.57 | Nd Ⅱ | 4280.04 | CH | 4288.96 | Fe Ⅰ |
| 4270.72 | Ce Ⅱ | 4280.14 | Ce Ⅱ | 4288.96 | CH |
| 4271.06 | Cr Ⅰ | 4280.41 | Cr Ⅰ | 4289.07 | Ti Ⅰ |
| 4271.16 | Fe Ⅰ | 4280.49 | Gd Ⅱ | 4289.08 | CH |
| 4271.76 | Fe Ⅰ | 4280.53 | Fe Ⅰ | 4289.36 | Ca Ⅰ |
| 4271.95 | CH | 4280.63 | Fe Ⅰp | 4289.72 | Cr Ⅰ |
| 4272.27 | Pr Ⅱ | 4280.63 | CH | 4289.92 | Ti Ⅰ |
| 4272.79 | Nd Ⅱ | 4280.79 | Sm Ⅱ | 4289.94 | Ce Ⅱ |
| 4273.31 | Ti Ⅰ | 4280.97 | CH | 4290.06 | CH |
| 4273.32 | Fe Ⅱ | 4281.10 | Mn Ⅰ | 4290.22 | Ti Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4290.38 | Fe Ⅰ | 4297.76 | Pr Ⅱ | 4305.45 | Sr Ⅱ |
| 4290.50 | V Ⅱ | 4297.98 | CH | 4305.45 | Cr Ⅰ |
| 4290.87 | Fe Ⅰ | 4298.03 | V Ⅰ | 4305.46 | Fe Ⅰ |
| 4290.93 | Ti Ⅰ | 4298.04 | Fe Ⅰ | 4305.47 | Ti Ⅰ |
| 4290.96 | CH | 4298.66 | Ti Ⅰ | 4305.72 | Se Ⅱ |
| 4291.12 | CH | 4298.81 | CH | 4305.85 | CH |
| 4291.21 | Ti Ⅰ | 4298.99 | Ca Ⅰ | 4305.91 | Ti Ⅰ |
| 4291.21 | Ti Ⅰ | 4299.23 | Ti Ⅰ | 4306.14 | CH |
| 4291.47 | Fe Ⅰ | 4299.24 | Fe Ⅰ | 4306.58 | Fe Ⅰp |
| 4291.47 | Fe Ⅰ | 4299.36 | Ce Ⅱ | 4306.70 | CH |
| 4291.82 | V Ⅰ | 4299.64 | Ti Ⅱ | 4306.72 | Ce Ⅱ |
| 4292.05 | CH | 4299.65 | Fe Ⅰ | 4306.86 | CH |
| 4292.13 | Fe Ⅰp | 4300.05 | Ti Ⅱ | 4306.94 | Ti Ⅰ |
| 4292.18 | Sm Ⅱ | 4300.32 | CH | 4307.31 | CH |
| 4292.29 | Fe Ⅰ | 4300.33 | Ce Ⅱ | 4307.56 | CH |
| 4293.11 | CH | 4300.44 | La Ⅱ | 4307.74 | Ca Ⅰ |
| 4293.14 | Zr Ⅱ | 4300.57 | Ti Ⅰ | 4307.78 | Nd Ⅱ |
| 4294.04 | Fe Ⅰp | 4300.57 | CH | 4307.90 | Ti Ⅱ |
| 4294.10 | Ti Ⅱ | 4300.83 | Fe Ⅰ | 4307.91 | Fe Ⅰ |
| 4294.13 | Fe Ⅰ | 4301.09 | Ti Ⅰ | 4307.91 | CH |
| 4294.62 | W Ⅰ | 4301.11 | CH | 4308.18 | CH |
| 4294.62 | CH | 4301.75 | CH | 4308.38 | CH |
| 4294.77 | Sc Ⅱ | 4301.93 | Ti Ⅱ | 4308.51 | Ti Ⅰ |
| 4295.04 | CH | 4302.10 | Pr Ⅱ | 4308.60 | CH |
| 4295.23 | CH | 4302.11 | W Ⅰ | 4308.91 | CH |
| 4295.75 | Ti Ⅰ | 4302.19 | Fe Ⅰ | 4309.01 | Sm Ⅱ |
| 4295.76 | Cr Ⅰ | 4302.53 | Ca Ⅰ | 4309.04 | Fe Ⅰ |
| 4295.89 | Ni Ⅰ | 4302.76 | CH | 4309.20 | CH |
| 4296.65 | La Ⅱ | 4302.91 | CH | 4309.38 | Fe Ⅰ |
| 4296.07 | Ce Ⅱ | 4303.17 | Fe Ⅱ | 4309.38 | CH |
| 4296.08 | Gd Ⅱ | 4303.43 | CH | 4309.62 | Y Ⅱ |
| 4296.11 | V Ⅰ | 4303.58 | Nd Ⅱ | 4309.63 | CH |
| 4296.57 | Fe Ⅱ | 4303.94 | CH | 4309.71 | CH |
| 4296.68 | Ce Ⅱ | 4304.26 | CH | 4309.74 | Ce Ⅱ |
| 4296.68 | CH | 4304.40 | CH | 4309.80 | V Ⅰ |
| 4296.74 | Zr Ⅱ | 4304.55 | Fe Ⅰ | 4309.84 | CH |
| 4296.79 | Ce Ⅱ | 4304.57 | CH | 4310.11 | CH |
| 4296.96 | CH | 4304.72 | CH | 4310.47 | CH |
| 4297.05 | Cr Ⅰ | 4304.94 | Sm Ⅱ | 4310.70 | Ce Ⅱ |
| 4297.22 | CH | 4305.11 | CH | 4310.98 | Gd Ⅱ |
| 4297.53 | CH | 4305.32 | CH | 4311.17 | CH |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4311.52 | CH | 4322.70 | Fe Ⅰp | 4330.71 | Ti Ⅱ |
| 4311.65 | Ti Ⅰ | 4323.01 | CH | 4330.72 | Ni Ⅰ |
| 4312.09 | CH | 4323.06 | CH | 4330.96 | Fe Ⅰ |
| 4312.15 | CH | 4323.23 | CH | 4331.65 | Ni Ⅰ |
| 4312.23 | Zr Ⅱ | 4323.28 | Sm Ⅱ | 4331.79 | V Ⅱ |
| 4312.30 | CH | 4323.44 | Ti Ⅰ | 4332.57 | Cr Ⅰ |
| 4312.56 | CH | 4323.51 | CH | 4332.58 | CH |
| 4312.71 | CH | 4323.55 | Pr Ⅱ | 4332.82 | V Ⅰ |
| 4312.86 | Ti Ⅱ | 4323.61 | CH | 4332.92 | CH |
| 4312.88 | CH | 4323.71 | Ni Ⅰ | 4333.21 | CH |
| 4313.04 | CH | 4323.85 | CH | 4333.28 | Zr Ⅱ |
| 4313.62 | CH | 4323.97 | CH | 4333.76 | La Ⅱ |
| 4314.08 | Sc Ⅱ | 4324.06 | Gd Ⅱ | 4333.91 | Pr Ⅱ |
| 4314.09 | CH | 4324.08 | CH | 4334.02 | CH |
| 4314.29 | Fe Ⅱ | 4324.41 | CH | 4334.15 | Sm Ⅱ |
| 4314.51 | Nd Ⅱ | 4324.82 | CH | 4334.67 | CH |
| 4314.74 | Ti Ⅰp | 4325.01 | Sc Ⅱ | 4334.80 | CH |
| 4314.80 | Ti Ⅰ | 4325.08 | Cr Ⅰ | 4334.84 | Ti Ⅰ |
| 4314.98 | Ti Ⅱ | 4325.13 | Ti Ⅰ | 4334.96 | La Ⅱ |
| 4315.09 | Fe Ⅰ | 4326.36 | Ni Ⅰ | 4335.27 | CH |
| 4315.35 | Sm Ⅱ | 4325.36 | CH | 4336.26 | Ce Ⅱ |
| 4316.05 | Gd Ⅱ | 4325.61 | Ni Ⅰ | 4337.05 | Fe Ⅰ |
| 4316.27 | Gd Ⅱ | 4325.77 | Nd Ⅱ | 4337.33 | Ti Ⅱ |
| 4316.81 | Ti Ⅱ | 4325.77 | Fe Ⅰ | 4337.57 | Cr Ⅰ |
| 4317.04 | Fe Ⅰp | 4325.95 | Fe Ⅰp | 4337.78 | Ce Ⅱ |
| 4317.32 | Zr Ⅱ | 4326.36 | Ti Ⅰ | 4337.92 | Ti Ⅱ |
| 4317.90 | Cr Ⅰ | 4326.43 | Tb Ⅰ | 4338.26 | Fe Ⅰ |
| 4318.63 | Ti Ⅰ | 4326.74 | Ba Ⅱ | 4338.70 | Nd Ⅱ |
| 4318.65 | Ca Ⅰ | 4326.76 | Fe Ⅰ | 4338.80 | Cr Ⅰ |
| 4318.77 | Cr Ⅱp | 4327.10 | Fe Ⅰ | 4339.45 | Cr Ⅰ |
| 4318.94 | Sm Ⅱ | 4327.13 | Gd Ⅱ | 4340.13 | Cr Ⅰ |
| 4319.45 | Fe Ⅰp | 4327.92 | Fe Ⅰ | 4340.47 | H5 |
| 4319.51 | Hf Ⅱ | 4328.61 | CH | 4341.01 | V Ⅰ |
| 4319.64 | Cr Ⅰ | 4329.02 | Sm Ⅱ | 4341.28 | Gd Ⅱ |
| 4320.52 | Fe Ⅰ | 4329.29 | CH | 4341.37 | Ti Ⅱ |
| 4320.72 | Ce Ⅱ | 4329.39 | CH | 4341.83 | Fe Ⅰ |
| 4320.74 | Sc Ⅱ | 4329.54 | Fe Ⅰp | 4342.07 | Nd Ⅱ |
| 4320.97 | Ti Ⅱ | 4330.02 | V Ⅰ | 4342.18 | Gd Ⅱ |
| 4321.66 | Ti Ⅰ | 4330.26 | Ti Ⅱ | 4343.26 | Fe Ⅰ |
| 4321.80 | Fe Ⅰ | 4330.41 | CH | 4343.70 | Fe Ⅰ |
| 4322.51 | La Ⅱ | 4330.44 | Ce Ⅱ | 4343.70 | CH |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4344.29 | Ti Ⅱ | 4354.54 | Mg Ⅰ | 4365.74 | V Ⅰ |
| 4344.30 | Gd Ⅱ | 4354.61 | Sc Ⅱ | 4365.90 | Fe Ⅰ |
| 4344.51 | Cr Ⅰ | 4354.76 | CH | 4366.32 | Nd Ⅱ |
| 4344.89 | Fe Ⅰ | 4355.09 | Eu Ⅱ | 4366.50 | CH |
| 4345.08 | Cr Ⅰ | 4355.10 | Ca Ⅰ | 4366.68 | CH |
| 4345.86 | Sm Ⅱ | 4355.35 | CH | 4367.58 | Fe Ⅰ |
| 4345.96 | Ce Ⅱ | 4355.71 | CH | 4367.66 | Ti Ⅱ |
| 4346.30 | CH | 4355.91 | Ni Ⅰ | 4367.68 | CH |
| 4346.56 | Fe Ⅰ | 4355.94 | V Ⅰ | 4367.91 | Fe Ⅰ |
| 4346.61 | Ti Ⅰ | 4356.37 | CH | 4368.03 | Sm Ⅱ |
| 4346.83 | Cr Ⅰ | 4356.60 | CH | 4368.04 | V Ⅰ |
| 4347.24 | Fe Ⅰ | 4356.76 | Cr Ⅰ | 4368.25 | Cr Ⅰ |
| 4347.49 | Pr Ⅱ | 4357.52 | Cr Ⅰ | 4368.31 | Ni Ⅰ |
| 4347.80 | Sm Ⅱ | 4357.87 | CH | 4368.33 | Pr Ⅱ |
| 4347.85 | Fe Ⅰ | 4358.17 | Nd Ⅱ | 4368.63 | Nd Ⅱ |
| 4347.97 | CH | 4358.51 | Fe Ⅰ | 4369.40 | Fe Ⅱ |
| 4348.34 | CH | 4358.73 | Y Ⅱ | 4369.68 | Ti Ⅰ |
| 4348.94 | Fe Ⅰ | 4359.34 | CH | 4369.77 | Gd Ⅱ |
| 4349.79 | Ce Ⅱ | 4359.63 | Cr Ⅰ | 4369.77 | Fe Ⅰ |
| 4350.25 | CH | 4359.64 | Gd Ⅱ | 4369.78 | CH |
| 4350.47 | Sm Ⅱ | 4359.74 | Zr Ⅱ | 4370.04 | Ni Ⅰ |
| 4350.52 | Hf Ⅱ | 4359.80 | Pr Ⅱ | 4370.15 | CH |
| 4350.59 | Fe Ⅰ | 4360.29 | CH | 4370.88 | Mn Ⅰ |
| 4350.59 | CH | 4360.49 | Ti Ⅰ | 4370.96 | Zr Ⅱ |
| 4350.83 | Ti Ⅱ | 4360.48 | CH | 4370.99 | CH |
| 4351.05 | Cr Ⅰ | 4360.72 | Sm Ⅱ | 4371.06 | CH |
| 4351.30 | Nd Ⅱ | 4360.81 | Fe Ⅰ | 4371.07 | Nd Ⅱ |
| 4351.55 | Fe Ⅰ | 4361.25 | Fe Ⅱ | 4371.28 | Cr Ⅰ |
| 4351.71 | CH | 4361.66 | Ce Ⅱ | 4371.28 | Cr Ⅰ |
| 4351.76 | Fe Ⅱ | 4362.04 | Sm Ⅱ | 4371.43 | CH |
| 4351.77 | Cr Ⅰ | 4362.53 | CH | 4371.58 | CH |
| 4351.85 | Pr Ⅱ | 4362.75 | CH | 4372.38 | Ti Ⅰ |
| 4351.89 | Mg Ⅰ | 4363.11 | CH | 4372.40 | Ce Ⅱ |
| 4352.56 | CH | 4363.13 | Cr Ⅰ | 4372.59 | Fe Ⅰ |
| 4352.73 | Ce Ⅱ | 4363.29 | CH | 4372.74 | CH |
| 4352.74 | Fe Ⅰ | 4363.64 | Mo Ⅱ | 4372.84 | CH |
| 4352.87 | V Ⅰ | 4363.60 | CH | 4373.23 | V Ⅰ |
| 4353.17 | CH | 4364.04 | CH | 4373.25 | Cr Ⅰ |
| 4353.43 | CH | 4364.17 | Y Ⅱ | 4373.55 | Fe Ⅰ |
| 4354.06 | Ti Ⅰ | 4364.66 | Ce Ⅱ | 4373.56 | Fe Ⅰ |
| 4354.36 | Fe Ⅱ | 4364.66 | La Ⅱ | 4373.79 | CH |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4373.82 | Ce Ⅱ | 4384.12 | CH | 4393.03 | CH |
| 4374.16 | Cr Ⅰ | 4384.33 | Fe Ⅰp | 4393.52 | CH |
| 4374.23 | CH | 4384.64 | Mg Ⅱ | 4393.53 | Cr Ⅰ |
| 4374.46 | Sc Ⅱ | 4384.72 | V Ⅰ | 4393.70 | CH |
| 4374.49 | Fe Ⅰ | 4384.72 | V Ⅰ | 4393.92 | Ti Ⅰ |
| 4374.83 | Ti Ⅱ | 4384.81 | Sc Ⅱ | 4394.06 | Ti Ⅱ |
| 4374.92 | Nd Ⅱ | 4385.12 | CH | 4394.18 | Nd Ⅱ |
| 4374.94 | Y Ⅱ | 4385.26 | Fe Ⅰ | 4395.03 | Ti Ⅱ |
| 4375.30 | V Ⅰ | 4385.38 | Fe Ⅱ | 4395.23 | V Ⅰ |
| 4375.33 | Cr Ⅰ | 4385.66 | Nd Ⅱ | 4395.50 | CH |
| 4375.58 | CH | 4386.06 | CH | 4395.51 | Fe Ⅰ |
| 4375.66 | CH | 4386.84 | Ce Ⅱ | 4395.51 | Fe Ⅰ |
| 4375.92 | Ce Ⅱ | 4386.86 | Ti Ⅱ | 4395.85 | Ti Ⅱ |
| 4375.93 | Fe Ⅰ | 4387.06 | CH | 4396.08 | CH |
| 4376.78 | Fe Ⅰ | 4387.40 | CH | 4396.15 | CH |
| 4376.78 | Fe Ⅰ | 4387.50 | Cr Ⅰ | 4396.31 | CH |
| 4376.80 | Fe Ⅰ | 4387.60 | CH | 4396.96 | CH |
| 4377.24 | CH | 4387.67 | Gd Ⅱ | 4397.25 | Cr Ⅰ |
| 4377.33 | Fe Ⅰ | 4387.93 | He Ⅰ | 4397.51 | Gd Ⅱ |
| 4377.37 | CH | 4388.08 | Ti Ⅰ | 4398.02 | Y Ⅱ |
| 4377.77 | Mo Ⅱ | 4388.41 | Fe Ⅰ | 4398.31 | Ti Ⅱ |
| 4378.24 | Sm Ⅱ | 4388.50 | Zr Ⅱ | 4398.52 | V Ⅱ |
| 4378.26 | CH | 4388.87 | CH | 4398.79 | Ce Ⅱ |
| 4378.91 | CH | 4389.24 | Fe Ⅰ | 4399.20 | Ce Ⅱ |
| 4379.24 | V Ⅰ | 4389.64 | CH | 4399.61 | Ni Ⅰ |
| 4379.78 | Zr Ⅱ | 4389.78 | CH | 4399.77 | Ti Ⅱ |
| 4379.78 | Cr Ⅰ | 4389.97 | V Ⅰ | 4399.82 | Cr Ⅰ |
| 4380.06 | Ce Ⅱ | 4390.46 | Fe Ⅰ | 4400.35 | Sc Ⅱ |
| 4380.55 | Cr Ⅰ | 4390.59 | Mg Ⅱ | 4400.58 | V Ⅱ |
| 4380.64 | Gd Ⅱ | 4390.86 | Sm Ⅱ | 4400.63 | Ti Ⅱp |
| 4380.73 | CH | 4390.95 | Fe Ⅰ | 4400.83 | Nd Ⅱ |
| 4380.99 | CH | 4390.98 | Ti Ⅱ | 4401.29 | Fe Ⅰ |
| 4381.11 | Cr Ⅰ | 4391.11 | Nd Ⅱ | 4401.45 | Fe Ⅰ |
| 4381.70 | Mn Ⅰ | 4391.11 | Th Ⅱ | 4401.55 | Ni Ⅰ |
| 4382.17 | Ce Ⅱ | 4391.66 | Ce Ⅱ | 4402.84 | CH |
| 4382.77 | CH | 4391.75 | Cr Ⅰ | 4403.35 | Zr Ⅱ |
| 4382.78 | Fe Ⅰ | 4391.87 | Fe Ⅰp | 4403.37 | Cr Ⅰ |
| 4383.00 | CH | 4392.07 | CH | 4403.50 | Cr Ⅰ |
| 4383.12 | Gd Ⅱ | 4392.07 | V Ⅰ | 4404.10 | Fe Ⅰp |
| 4383.44 | La Ⅱ | 4392.58 | Fe Ⅰ | 4404.28 | Ti Ⅰ |
| 4383.55 | Fe Ⅰ | 4392.92 | CH | 4404.28 | Ti Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4404.40 | Ti Ⅰ | 4413.87 | Cr Ⅰ | 4426.15 | Gd Ⅱ |
| 4404.68 | V Ⅱ | 4414.17 | V Ⅱp | 4427.10 | Ti Ⅰ |
| 4404.75 | Fe Ⅰ | 4414.47 | Fe Ⅰp | 4427.31 | Fe Ⅰ |
| 4404.91 | Ti Ⅰ | 4414.54 | Zr Ⅱ | 4427.52 | La Ⅱ |
| 4405.01 | V Ⅰ | 4414.88 | Mn Ⅰ | 4427.90 | Ti Ⅱp |
| 4405.40 | Fe Ⅰp | 4415.13 | Fe Ⅰ | 4427.92 | Ce Ⅱ |
| 4405.69 | Ti Ⅰ | 4415.56 | Sc Ⅱ | 4428.50 | Cr Ⅰ |
| 4405.73 | CH | 4416.36 | CH | 4428.52 | V Ⅰ |
| 4405.85 | Pr Ⅱ | 4416.54 | Ti Ⅰ | 4429.20 | Fe Ⅰp |
| 4406.04 | CH | 4416.82 | Fe Ⅱ | 2429.24 | Pr Ⅱ |
| 4406.64 | V Ⅰ | 4417.27 | Ti Ⅰ | 2429.24 | Pr Ⅱ |
| 4407.28 | Ce Ⅱ | 4417.40 | Co Ⅰ | 2429.27 | Ce Ⅱ |
| 4407.68 | Ti Ⅱ | 4417.72 | Ti Ⅱ | 2229.32 | Fe Ⅰ |
| 4407.71 | Fe Ⅰ | 4418.34 | Ti Ⅱ | 2229.90 | La Ⅱ |
| 4408.20 | V Ⅰ | 4418.78 | Ce Ⅱ | 4429.94 | Cr Ⅰ |
| 4408.42 | Fe Ⅰ | 4419.03 | Gd Ⅱ | 4430.02 | Ti Ⅰ |
| 4408.51 | V Ⅰ | 4419.30 | Fe Ⅰp | 4430.20 | Fe Ⅰ |
| 4408.84 | Pr Ⅱ | 4419.51 | Fe Ⅰ | 4430.37 | Ti Ⅰ |
| 4408.90 | V Ⅱ | 4419.78 | Fe Ⅰp | 4430.49 | Cr Ⅰ |
| 4409.12 | Fe Ⅰ | 4420.29 | Fe Ⅰ | 4430.51 | Cr Ⅰp |
| 4409.22 | Ti Ⅱ | 4420.53 | Sm Ⅱ | 4430.62 | Fe Ⅰ |
| 4409.35 | Dy Ⅱ | 4420.66 | Sc Ⅱ | 4431.28 | Ti Ⅰ |
| 4409.52 | Ti Ⅱ | 4421.14 | Sm Ⅱ | 4431.37 | Sc Ⅱ |
| 4410.01 | CH | 4421.57 | V Ⅰ | 4432.09 | Ti Ⅱ |
| 4410.30 | Cr Ⅰ | 4421.75 | Ti Ⅰ | 4432.18 | Cr Ⅰ |
| 4410.52 | Ni Ⅰ | 4421.95 | Ti Ⅱ | 4432.57 | Fe Ⅰ |
| 4410.97 | Cr Ⅰ | 4422.57 | Fe Ⅰ | 4432.74 | Cr Ⅰ |
| 4411.05 | Nd Ⅱ | 4422.59 | Y Ⅱ | 4432.95 | La Ⅱ |
| 4411.08 | Ti Ⅱ | 4422.82 | Ti Ⅰ | 4433.22 | Fe Ⅰ |
| 4411.09 | Cr Ⅰ | 4423.00 | Ni Ⅰ | 4433.39 | Fe Ⅰp |
| 4411.23 | CH | 4423.15 | Fe Ⅰ | 4433.64 | Gd Ⅱ |
| 4411.79 | Co Ⅰ | 4423.22 | Ti Ⅱp | 4433.79 | Fe Ⅰ |
| 4411.88 | Mn Ⅰ | 4423.86 | Fe Ⅰ | 4433.89 | Sm Ⅱ |
| 4411.94 | Ti Ⅱ | 4424.08 | Cr Ⅰ | 4434.00 | Ti Ⅰ |
| 4412.16 | Pr Ⅱ | 4424.19 | Fe Ⅰ | 4434.00 | Ti Ⅰ |
| 4412.25 | Cr Ⅰ | 4424.28 | Cr Ⅰ | 4434.32 | Sm Ⅱ |
| 4412.26 | Nd Ⅱ | 4424.34 | Sm Ⅱ | 4434.75 | Cr Ⅰ |
| 4413.40 | Fe Ⅰp | 4424.59 | V Ⅰ | 4434.96 | Ca Ⅰ |
| 4413.60 | Fe Ⅱ | 4425.44 | Ca Ⅰ | 4435.15 | Fe Ⅰ |
| 4413.77 | Pr Ⅱ | 4426.00 | V Ⅰ | 4435.58 | Eu Ⅱ |
| 4413.78 | Nd Ⅱ | 4426.05 | Ti Ⅰ | 4435.69 | Ca Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4435.84 | La Ⅱ | 4445.48 | Fe Ⅰ | 4433.89 | Sm Ⅱ |
| 4436.14 | V Ⅰ | 4445.71 | Co Ⅰ | 4434.00 | Ti Ⅰ |
| 4436.22 | Gd Ⅱ | 4445.88 | Zr Ⅱ | 4434.00 | Ti Ⅰ |
| 4436.35 | Mn Ⅰ | 4446.25 | Fe Ⅱ | 4434.32 | Sm Ⅱ |
| 4436.48 | Mg Ⅱ | 4446.39 | Nd Ⅱ | 4434.75 | Cr Ⅰ |
| 4436.64 | Ti Ⅰ | 4446.49 | Gd Ⅱ | 4434.96 | Ca Ⅰ |
| 4436.93 | Fe Ⅰ | 4446.84 | Fe Ⅰ | 4435.15 | Fe Ⅰ |
| 4436.98 | Ni Ⅰ | 4447.13 | Fe Ⅰ | 4435.58 | Eu Ⅱ |
| 4437.55 | He Ⅰ | 4447.72 | Fe Ⅰ | 4435.69 | Ca Ⅰ |
| 4437.57 | Ni Ⅰ | 4449.14 | Ti Ⅰ | 4435.84 | La Ⅱ |
| 4437.61 | Ce Ⅱ | 4449.34 | Ce Ⅱ | 4436.14 | V Ⅰ |
| 4437.84 | V Ⅰ | 4449.66 | Fe Ⅱ | 4436.22 | Gd Ⅱ |
| 4438.23 | Ti Ⅰ | 4449.70 | Dy Ⅱ | 4436.35 | Mn Ⅰ |
| 4438.27 | Gd Ⅱ | 4426.05 | Ti Ⅰ | 4436.48 | Mg Ⅱ |
| 4438.35 | Fe Ⅰ | 4426.15 | Gd Ⅱ | 4436.64 | Ti Ⅰ |
| 4438.53 | Fe Ⅰp | 4427.10 | Ti Ⅰ | 4436.93 | Fe Ⅰ |
| 4439.13 | Fe Ⅱp | 4427.31 | Fe Ⅰ | 4436.98 | Ni Ⅰ |
| 4439.64 | Fe Ⅰ | 4427.52 | La Ⅱ | 4437.55 | He Ⅰ |
| 4439.88 | Fe Ⅰ | 4427.90 | Ti Ⅱp | 4437.57 | Ni Ⅰ |
| 4440.34 | Ti Ⅰ | 4427.92 | Ce Ⅱ | 4437.61 | Ce Ⅱ |
| 4440.45 | Zr Ⅱ | 4428.50 | Cr Ⅰ | 4437.84 | V Ⅰ |
| 4440.48 | Fe Ⅰ | 4428.52 | V Ⅰ | 4438.23 | Ti Ⅰ |
| 4440.84 | Fe Ⅰ | 4429.20 | Fe Ⅰp | 4438.27 | Gd Ⅱ |
| 4440.88 | Ce Ⅱ | 4429.94 | Cr Ⅰ | 4438.35 | Fe Ⅰ |
| 4440.97 | Fe Ⅰ | 4430.02 | Ti Ⅰ | 4438.53 | Fe Ⅰp |
| 4441.56 | Fe Ⅰp | 4430.20 | Fe Ⅰ | 4439.13 | Fe Ⅱp |
| 4441.68 | V Ⅰ | 4430.37 | Ti Ⅰ | 4439.64 | Fe Ⅰ |
| 4442.27 | Cr Ⅰ | 4430.49 | Cr Ⅰ | 4439.88 | Fe Ⅰ |
| 4442.34 | Fe Ⅰ | 4430.51 | Cr Ⅰp | 4440.34 | Ti Ⅰ |
| 4442.72 | Ce Ⅱp | 4430.62 | Fe Ⅰ | 4440.45 | Zr Ⅱ |
| 4442.84 | Fe Ⅰ | 4431.28 | Ti Ⅰ | 4440.48 | Fe Ⅰ |
| 4442.99 | Zr Ⅱ | 4431.37 | Sc Ⅱ | 4440.84 | Fe Ⅰ |
| 4443.20 | Fe Ⅰ | 4432.09 | Ti Ⅱ | 4440.88 | Ce Ⅱ |
| 4443.71 | Cr Ⅰ | 4432.18 | Cr Ⅰ | 4440.97 | Fe Ⅰ |
| 4443.74 | Ce Ⅱ | 4432.57 | Fe Ⅰ | 4441.56 | Fe Ⅰp |
| 4443.80 | Ti Ⅱ | 4432.74 | Cr Ⅰ | 4441.68 | V Ⅰ |
| 4444.21 | V Ⅰ | 4432.95 | La Ⅱ | 4442.27 | Cr Ⅰ |
| 4444.26 | Sm Ⅱ | 4433.22 | Fe Ⅰ | 4442.34 | Fe Ⅰ |
| 4444.27 | Ti Ⅰ | 4433.39 | Fe Ⅰp | 4442.72 | Ce Ⅱp |
| 4444.39 | Ce Ⅱ | 4433.64 | Gd Ⅱ | 4442.84 | Fe Ⅰ |
| 4444.56 | Ti Ⅱ | 4433.79 | Fe Ⅰ | 4442.99 | Zr Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4443.20 | Fe Ⅰ | 4454.63 | Sm Ⅱ | 4461.99 | Fe Ⅰ |
| 4443.71 | Cr Ⅰ | 4454.66 | Fe Ⅰ | 4462.02 | Mn Ⅰ |
| 4443.74 | Ce Ⅱ | 4454.78 | Ca Ⅰ | 4462.36 | V Ⅰ |
| 4443.80 | Ti Ⅱ | 4454.80 | Zr Ⅱ | 4462.41 | Nd Ⅱ |
| 4444.21 | V Ⅰ | 4455.01 | Mn Ⅰ | 4462.46 | Ni Ⅰ |
| 4444.26 | Sm Ⅱ | 4455.03 | Fe Ⅰ | 4462.76 | V Ⅱp |
| 4444.27 | Ti Ⅰ | 4455.32 | Mn Ⅰ | 4462.77 | Cr Ⅰ |
| 4444.39 | Ce Ⅱ | 4455.32 | Ti Ⅰ | 4462.98 | Nd Ⅱ |
| 4444.56 | Ti Ⅱ | 4455.82 | Mn Ⅰ | 4463.14 | Fe Ⅰp |
| 4445.48 | Fe Ⅰ | 4455.85 | Fe Ⅱp | 4463.39 | Ti Ⅰ |
| 4445.71 | Co Ⅰ | 4455.89 | Ca Ⅰ | 4463.41 | Ce Ⅰ |
| 4445.88 | Zr Ⅱ | 4456.33 | Fe Ⅰ | 4463.43 | Ni Ⅰ |
| 4446.25 | Fe Ⅱ | 4456.39 | Nd Ⅱ | 4463.54 | Ti Ⅰ |
| 4446.39 | Nd Ⅱ | 4456.61 | Ca Ⅰ | 4464.32 | V Ⅱ |
| 4446.49 | Gd Ⅱ | 4456.63 | Fe Ⅰp | 4464.46 | Ti Ⅱ |
| 4446.84 | Fe Ⅰ | 4456.65 | Ti Ⅱ | 4464.67 | Cr Ⅰ |
| 4447.13 | Fe Ⅰ | 4457.04 | Mn Ⅰ | 4464.68 | Mn Ⅰ |
| 4447.72 | Fe Ⅰ | 4457.42 | Zr Ⅱ | 4464.77 | Fe Ⅰ |
| 4449.14 | Ti Ⅰ | 4457.43 | Ti Ⅰ | 4464.91 | Cr Ⅰ |
| 4449.34 | Ce Ⅱ | 4457.48 | V Ⅰ | 4465.15 | Cr Ⅰ |
| 4449.66 | Fe Ⅱ | 4457.55 | Mn Ⅰ | 4465.36 | Cr Ⅰ |
| 4449.70 | Dy Ⅱ | 4457.76 | V Ⅰ | 4465.60 | Nd Ⅱ |
| 4449.98 | Ti Ⅰ | 4458.10 | Fe Ⅰ | 4465.78 | Cr Ⅱ |
| 4450.32 | Fe Ⅰ | 4458.26 | Mn Ⅰ | 4465.81 | Ti Ⅰ |
| 4450.49 | Ti Ⅱ | 4458.52 | Sm Ⅱ | 4466.39 | Ni Ⅰ |
| 4450.73 | Ce Ⅱ | 4458.54 | Cr Ⅰ | 4466.41 | Hf Ⅱ |
| 4450.77 | Fe Ⅰp | 4459.04 | Ni Ⅰ | 4466.55 | Gd Ⅱ |
| 4450.90 | Ti Ⅰ | 4459.12 | Fe Ⅰ | 4466.55 | Fe Ⅰ |
| 4451.57 | Nd Ⅱ | 4459.34 | Cr Ⅰ | 4466.88 | Co Ⅰ |
| 4451.59 | Mn Ⅱ | 4459.74 | Cr Ⅰ | 4466.94 | Fe Ⅰ |
| 4451.98 | Nd Ⅱ | 4459.76 | V Ⅰ | 4467.23 | Gd Ⅱ |
| 4452.01 | V Ⅰ | 4460.21 | Ce Ⅱ | 4467.34 | Sm Ⅱ |
| 4452.62 | Fe Ⅰp | 4460.29 | V Ⅰ | 4467.56 | Cr Ⅰ |
| 4452.73 | Sm Ⅱ | 4460.38 | Mn Ⅰ | 4468.01 | V Ⅰ |
| 4453.01 | Mn Ⅰ | 4460.77 | Cr Ⅰ | 4468.38 | Cr Ⅰ |
| 4453.31 | Ti Ⅰ | 4461.08 | Mn Ⅰ | 4468.49 | Ti Ⅱ |
| 4453.35 | V Ⅱ | 4461.14 | Ce Ⅱ | 4468.71 | Pr Ⅱ |
| 4453.71 | Ti Ⅰ | 4461.20 | Fe Ⅰ | 4469.16 | Ti Ⅱ |
| 4453.93 | Gd Ⅱ | 4461.22 | Zr Ⅱ | 4469.38 | Fe Ⅰ |
| 4454.38 | Fe Ⅰ | 4461.43 | Fe Ⅱp | 4469.55 | Co Ⅰ |
| 4454.38 | Pr Ⅱ | 4461.65 | Fe Ⅰ | 4469.71 | V Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4470.14 | Mn Ⅰ | 4480.27 | Fe Ⅰp | 4490.24 | Fe Ⅰ |
| 4470.48 | Ni Ⅰ | 4480.60 | Ti Ⅰ | 4490.54 | Ni Ⅰ |
| 4470.86 | Ti Ⅱ | 4481.13 | Mg Ⅱ | 4490.54 | Ni Ⅰ |
| 4471.24 | Ti Ⅰ | 4481.23 | Ni Ⅰ | 4490.63 | Fe Ⅰ |
| 4471.24 | Ce Ⅱ | 4481.26 | Ti Ⅰ | 4490.77 | Fe Ⅰ |
| 4471.29 | Gd Ⅱ | 4481.33 | Mg Ⅱ | 4490.77 | Fe Ⅰ |
| 4471.41 | Nd Ⅱ | 4481.62 | Fe Ⅰ | 4490.82 | V Ⅰ |
| 4471.48 | He Ⅰ | 4482.17 | Fe Ⅰ | 4491.40 | Fe Ⅱ |
| 4471.55 | Co Ⅰ | 4482.26 | Fe Ⅰ | 4491.68 | Cr Ⅰ |
| 4471.69 | He Ⅰ | 4482.69 | Ti Ⅰ | 4492.31 | Cr Ⅰ |
| 4471.81 | Fe Ⅰp | 4482.75 | Fe Ⅰ | 4492.54 | Ti Ⅰ |
| 4472.43 | Sm Ⅱ | 4482.88 | Cr Ⅰ | 4492.69 | Fe Ⅰ |
| 4472.72 | Fe Ⅰ | 4483.33 | Gd Ⅱ | 4493.37 | Fe Ⅰ |
| 4472.72 | Fe Ⅰ | 4483.78 | Fe Ⅰp | 4493.53 | Ti Ⅱ |
| 4472.79 | Mn Ⅰ | 4483.90 | Ce Ⅱ | 4493.58 | Fe Ⅱ |
| 4472.92 | Fe Ⅱ | 4483.92 | Co Ⅰ | 4494.05 | Fe Ⅰ |
| 4473.02 | Sm Ⅱ | 4484.23 | Fe Ⅰ | 4494.18 | Na Ⅰ |
| 4473.78 | Cr Ⅰ | 4484.51 | Co Ⅰ | 4494.41 | Zr Ⅱ |
| 4473.84 | Pr Ⅱ | 4484.68 | Cr Ⅰ | 4494.57 | Fe Ⅰ |
| 4474.71 | V Ⅰ | 4485.44 | Zr Ⅱ | 4494.74 | Co Ⅰ |
| 4474.85 | Ti Ⅰ | 4485.68 | Fe Ⅰ | 4494.85 | Gd Ⅱ |
| 4474.85 | Ti Ⅰ | 4485.97 | Fe Ⅰ | 4495.01 | Ti Ⅰ |
| 4475.19 | Ti Ⅰp | 4486.13 | Hf Ⅱ | 4495.39 | Fe Ⅰ |
| 4475.20 | Cr Ⅰp | 4486.14 | Hf Ⅱ | 4495.39 | Fe Ⅰ |
| 4475.35 | Cr Ⅰ | 4486.65 | Hf Ⅱ | 4495.44 | Zr Ⅱ |
| 4475.70 | V Ⅱ | 4486.91 | Ce Ⅱ | 4495.46 | Ti Ⅱ |
| 4475.72 | Y Ⅰ | 4487.01 | Fe Ⅰ | 4495.57 | Fe Ⅰ |
| 4476.02 | Fe Ⅰ | 4488.05 | Cr Ⅰ | 4496.06 | V Ⅰ |
| 4477.02 | Cr Ⅰ | 4488.14 | Fe Ⅰ | 4496.15 | Ti Ⅰ |
| 4477.45 | Y Ⅰ | 4488.32 | Ti Ⅱ | 4496.43 | Pr Ⅱ |
| 4478.04 | Fe Ⅰ | 4488.40 | GdⅡ | 4496.75 | Ti Ⅰ |
| 4478.32 | Co Ⅰ | 4488.90 | V Ⅰ | 4496.86 | C rⅠ |
| 4478.66 | Sm Ⅱ | 4488.90 | V Ⅰ | 4496.86 | V Ⅰ |
| 4478.80 | Gd Ⅱ | 4488.92 | Fe Ⅰ | 4496.96 | Zr Ⅱ |
| 4479.36 | Ce Ⅱ | 4488.92 | Fe Ⅰ | 4497.66 | Na Ⅰ |
| 4479.43 | Ce Ⅱ | 4489.09 | Ti Ⅰ | 4497.85 | Ce Ⅱ |
| 4479.61 | Fe Ⅰ | 4489.18 | Fe Ⅱ | 4498.28 | Gd Ⅱ |
| 4479.61 | Fe Ⅰ | 4489.47 | Cr Ⅰ | 4498.73 | Cr Ⅰ |
| 4479.72 | Ti Ⅰ | 4489.74 | Fe Ⅰ | 4498.90 | Mn Ⅰ |
| 4479.97 | Fe Ⅰp | 4490.08 | Mn Ⅰ | 4499.48 | Sm Ⅱ |
| 4480.14 | Fe Ⅰ | 4490.08 | Fe Ⅰ | 4500.29 | Cr Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4500.64 | Fe Ⅰ | 4516.56 | Cr Ⅱ | 4526.94 | Ca I |
| 4501.11 | Cr Ⅰ | 4517.09 | Co Ⅰ | 4527.25 | Y I |
| 4501.27 | Ti Ⅱ | 4517.53 | Fe Ⅰ | 4527.30 | Ti I |
| 4501.79 | Cr Ⅰ | 4518.02 | Ti Ⅰ | 4527.34 | Cr I |
| 4501.81 | Nd Ⅱ | 4518.30 | Ti Ⅱ | 4527.34 | Cr I |
| 4502.16 | Ln Ⅱ | 4518.38 | V Ⅱ | 4527.35 | Ce II |
| 4502.22 | Mn Ⅰ | 4518.58 | Fe Ⅰ | 4527.80 | Fe I |
| 4502.59 | Fe Ⅰ | 4519.63 | Sm Ⅱ | 4527.80 | Y I |
| 4503.76 | Ti Ⅰ | 4519.83 | Cr Ⅰ | 4528.51 | V II |
| 4504.84 | Fe Ⅰ | 4519.99 | Ni Ⅰ | 4528.62 | Fe I |
| 4505.00 | Ca Ⅰ | 4520.07 | Gd Ⅱ | 4528.76 | Fe I p |
| 4505.95 | Y Ⅰ | 4520.22 | Fe Ⅱ | 4529.46 | Ti II |
| 4506.30 | Ni Ⅰ | 4520.24 | Fe Ⅱ | 4529.56 | Fe I |
| 4506.33 | Gd Ⅰ | 4520.37 | Ti Ⅱ | 4529.59 | V I |
| 4506.58 | Nd Ⅱ | 4521.14 | Cr Ⅰ | 4529.69 | Fe I |
| 4506.62 | Ca Ⅰ | 4521.14 | Cr Ⅰ | 4529.85 | Cr I |
| 4506.74 | Ti Ⅱ | 4521.30 | Gd Ⅱ | 4530.69 | Cr I |
| 4507.20 | Fe Ⅱ | 4521.92 | Ni Ⅰ | 4530.76 | Cr I |
| 4507.85 | Ca Ⅰ | 4522.37 | La Ⅱ | 4530.95 | Co I |
| 4508.26 | Fe Ⅱ | 4522.37 | La Ⅱ | 4531.15 | Fe I |
| 4508.28 | F e Ⅱ | 4522.59 | Eu Ⅱ | 4531.63 | Fe I |
| 4509.29 | VⅠ | 4522.63 | Fe Ⅱ | 4531.63 | Fe I |
| 4509.45 | Ca Ⅰ | 4522.80 | Ti Ⅰ | 4531.63 | Fe I |
| 4510.16 | Pr Ⅱ | 4523.04 | Sm Ⅱ | 4532.19 | V II |
| 4510.82 | Fe Ⅰ | 4523.08 | Ce Ⅱ | 4533.14 | Fe I |
| 4511.04 | Fe Ⅰ | 4523.40 | Fe Ⅰ | 4533.24 | Ti I |
| 4511.83 | Sm Ⅱ | 4523.91 | Sm Ⅱ | 4533.78 | Cr I |
| 4511.90 | Cr Ⅰ | 4524.09 | Fe Ⅰ | 4533.97 | Ti II |
| 4511.72 | V Ⅱ | 4524.22 | V Ⅰ | 4533.98 | Co I |
| 4512.73 | Ti Ⅰ | 4524.73 | Ti Ⅱ | 4534.15 | Pr II |
| 4512.99 | Ni Ⅰ | 4524.93 | Ba Ⅱ | 4534.17 | Fe II |
| 4512.21 | Cr Ⅰ | 4525.14 | Fe Ⅰ | 4534.78 | Ti I |
| 4513.58 | Y Ⅰ | 4525.15 | Fe Ⅰ | 4535.38 | Hf II |
| 4514.19 | V Ⅰ | 4525.17 | V Ⅰ | 4535.57 | Ti I |
| 4514.37 | Cr Ⅰ | 4525.21 | Ti Ⅱ | 4535.72 | Cr I |
| 4514.53 | Cr Ⅰ | 4525.88 | Fe Ⅰ | 4535.72 | Cr I |
| 4515.10 | Sm Ⅱ | 4526.11 | Cr Ⅰ | 4535.72 | Cr I |
| 4515.17 | Fe Ⅰ | 4526.12 | La II | 4535.92 | Ti I |
| 4515.34 | Fe Ⅱ | 4526.40 | Fe I p | 4536.05 | Ti I |
| 4515.44 | Cr Ⅰ | 4526.47 | Cr I | 4536.51 | Fe I |
| 4516.27 | Fe Ⅰ | 4526.56 | Fe I | 4537.68 | Fe I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4537.95 | Sm II | 4551.24 | Ni I | 4563.66 | Cr I |
| 4538.64 | V II | 4551.67 | Fe’I | 4563.76 | Ti II |
| 4538.76 | Fe I | 4552.25 | Ti II p | 4564.17 | Cr I |
| 4538.84 | Fe I | 4552.45 | Ti’I | 4564.59 | V II |
| 4539.10 | Ti I | 4552.54 | Fe I | 4564.72 | Fe I |
| 4539.62 | Cr II | 4552.66 | Sm II | 4564.83 | Fe I |
| 4539.76 | Ce II | 4553.17 | Ni I | 4565.32 | Fe I |
| 4539.79 | Cr I | 4553.95 | Cr I | 4565.51 | Cr I |
| 4540.50 | Cr I | 4553.97 | Zr II | 4565.58 | Co I |
| 4540.71 | La II | 4554.03 | Ba II | 4565.68 | Fe I |
| 4540.72 | Cr I | 4554.47 | Fe II | 4565.78 | Cr II |
| 4541.27 | Nd II | 4554.99 | Gd II | 4565.84 | Ce II |
| 4541.51 | Cr I | 4555.02 | Cr II | 4566.21 | Sm II |
| 4541.52 | Fe II | 4555.09 | Cr I | 4566.52 | Fe I |
| 4542.42 | Fe I | 4555.49 | Ti I | 4566.87 | Fe I |
| 4542.60 | Nd II | 4555.89 | Fe II | 4566.99 | Fe I |
| 4542.62 | Cr I | 4556.13 | Fe I | 4567.61 | Nd II |
| 4542.62 | Cr I | 4556.13 | Fe I | 4568.31 | Ti II |
| 4542.72 | Fe I | 4556.13 | Fe I | 4568.79 | Fe I |
| 4543.81 | Co I | 4556.14 | Nd II | 4568.84 | Fe I |
| 4543.95 | Sm II | 4556.17 | Cr I | 4569.64 | Cr I |
| 4544.01 | Ti II | 4556.74 | Nd II | 4570.02 | Co I |
| 4544.62 | Cr I | 4556.94 | Fe I | 4570.94 | La II |
| 4544.69 | Tr I | 4557.24 | Sc I | 4570.98 | Cr I |
| 4545.14 | Tr II | 4557.86 | Ti I | 4571.10 | Mg I |
| 4545.33 | Cr I | 4558.08 | Gd II | 4571.10 | Ce Ⅰ |
| 4545.39 | V I | 4558.09 | Ti I | 4571.44 | Fe Ⅰ |
| 4545.96 | Cr I | 4558.09 | Ti I | 4571.78 | V Ⅰ |
| 4545.99 | Co I | 4558.11 | Fe I | 4571.83 | Cr Ⅰ |
| 4546.93 | Ni I | 4558.11 | Fe I | 4571.97 | Ti Ⅱ |
| 4547.02 | Fe I | 4558.46 | La II | 4572.16 | Cr Ⅰ |
| 4547.23 | Ni I | 4558.46 | V II | 4572.16 | Cr Ⅰ |
| 4547.85 | Ti I | 4558.66 | Cr II | 4572.28 | Ce Ⅱ |
| 4547.85 | Fe I | 4559.94 | Ni I | 4572.86 | Fe Ⅰ |
| 4548.09 | Ti I | 4560.10 | Fe I | 4574.24 | Fe Ⅰ |
| 4548.76 | Ti I | 4560.28 | Ce II | 4574.45 | Cr Ⅰ |
| 4549.47 | Fe II | 4560.71 | V I | 4574.49 | Zr |
| 4549.62 | Ti II | 4560.96 | Ce II | 4574.72 | Fe Ⅰ |
| 4549.66 | Co I | 4561.46 | Pr II | 4574.87 | La |
| 4549.82 | Ti II p | 4562.36 | Ce II | 4575.12 | Cr Ⅰ |
| 4550.79 | Fe I | 4563.24 | Cr I | 4575.80 | Fe Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4576.33 | Fe Ⅰ | 4586.99 | Cr Ⅰ | 4600.37 | Ni Ⅰ |
| 4576.55 | Ti Ⅰ | 4587.13 | Fe Ⅰ | 4600.75 | Cr Ⅰ |
| 4576.76 | Cr Ⅰ | 4587.86 | Cr Ⅰ | 4601.02 | Cr Ⅰ |
| 4577.13 | V Ⅱ | 4588.14 | Fe Ⅰ | 4601.05 | Gd Ⅱ |
| 4577.17 | V Ⅰ | 4588.22 | Cr Ⅱ | 4601.15 | Cr Ⅰ |
| 4577.69 | Sm Ⅱ | 4588.73 | Co Ⅰ | 4601.34 | Fe Ⅱ |
| 4578.33 | Cr Ⅰ | 4589.89 | Cr Ⅱ | 4602.01 | Fe Ⅰ |
| 4578.56 | Co Ⅰ | 4589.96 | Ti Ⅱ | 4602.94 | Fe Ⅰ |
| 4578.73 | V Ⅰ | 4590.50 | V Ⅱ | 4603.96 | Fe Ⅰ |
| 4578.89 | Nd Ⅱ | 4590.69 | Cr Ⅰ | 4604.18 | SmⅡ |
| 4579.34 | Fe Ⅰ | 4591.22 | V Ⅰ | 4604.58 | Cr Ⅰ |
| 4580.05 | La Ⅱ | 4591.39 | Cr Ⅰ | 4604.99 | Ni Ⅰ |
| 4580.06 | Fe Ⅱ | 4591.82 | Sm | 4605.59 | Fe Ⅰ |
| 4580.06 | Fe Ⅱ | 4592.09 | Cr Ⅱ | 4605.78 | La Ⅱ |
| 4580.14 | Co Ⅰ | 4592.53 | Ni Ⅰ | 4606.23 | Ni Ⅰ |
| 4580.39 | V Ⅰ | 4592.54 | Cr Ⅰ | 4606.38 | Cr Ⅰ |
| 4580.60 | Fe Ⅰ | 4592.66 | Fe Ⅰ | 4606.40 | Ce Ⅱ |
| 4580.62 | Ni Ⅰ | 4593.54 | Sm Ⅱ | 4606.51 | Sm Ⅱ |
| 4581.06 | Cr Ⅰ | 4593.54 | Fe Ⅰ | 4607.33 | Sr Ⅰ |
| 4581.09 | Gd Ⅱ | 4593.84 | Cr Ⅰ | 4607.66 | Fe Ⅰ |
| 4581.32 | Y Ⅰ | 4593.93 | Ce Ⅱ | 4607.66 | Fe Ⅰ |
| 4581.40 | Co Ⅰ | 4594.03 | Eu Ⅰ | 4609.26 | Ti Ⅱ |
| 4581.52 | Fe Ⅰ | 4594.10 | V Ⅰ | 4609.36 | Ti Ⅰ |
| 4581.60 | Co Ⅰ | 4594.45 | Nd Ⅱ | 4609.65 | V Ⅰ |
| 4582.38 | Gd Ⅱ | 4594.63 | Co Ⅰ | 4609.89 | Cr Ⅰ |
| 4582.50 | Ce Ⅱ | 4594.96 | Fe Ⅰ | 4611.28 | Fe Ⅰ |
| 4582.84 | Fe Ⅱ | 4595.29 | Sm Ⅱ | 4611.29 | Fe Ⅰ |
| 4583.44 | Ti Ⅱ | 4595.36 | Fe Ⅰ | 4611.96 | Cr Ⅰ |
| 4583.72 | Fe Ⅰ | 4595.59 | Cr Ⅰ | 4612.47 | Nd Ⅱ |
| 4583.83 | Fe Ⅱ | 4595.95 | Ni Ⅰ | 4612.64 | Fe Ⅰ |
| 4583.89 | Cr Ⅰ | 4596.06 | Fe Ⅰ | 4613.21 | Fe Ⅰ |
| 4584.10 | Cr Ⅰ | 4596.43 | Fe Ⅰ | 4613.37 | Cr Ⅰ |
| 4584.73 | Fe Ⅰ | 4596.90 | Cr Ⅰ | 4613.38 | La Ⅱ |
| 4584.75 | Cr Ⅰ | 4597.01 | Nd Ⅱ | 4613.95 | Zr Ⅱ |
| 4584.82 | Fe Ⅰ | 4597.91 | Gd Ⅱ | 4614.15 | Cr Ⅱ |
| 4585.87 | Ca Ⅰ | 4598.12 | Fe Ⅰ | 4614.22 | Fe Ⅰ |
| 4585.92 | Ca Ⅰ | 4598.44 | Cr Ⅰ | 4614.52 | Cr Ⅰ |
| 4585.94 | V Ⅰ | 4598.74 | Fe Ⅰ | 4615.44 | Sm Ⅱ |
| 4586.14 | Cr Ⅰ | 4599.23 | Ti Ⅰ | 4615.69 | Sm Ⅱ |
| 4586.25 | Hf Ⅱ | 4600.10 | Cr Ⅰ | 4616.14 | Cr Ⅰ |
| 4586.36 | V Ⅰ | 4600.19 | VⅡ | 4616.64 | Cr Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4617.27 | Ti Ⅰ | 4632.83 | Fe I p | 4648.13 | Gr I |
| 4618.77 | Fe Ⅰ | 4632.91 | Fe I | 4648.16 | Ni I |
| 4618.80 | V Ⅰ | 4633.76 | Fe I | 4648.66 | Sm II |
| 4618.83 | Cr Ⅱ | 4634.11 | Cr II | 4648.87 | Gr I |
| 4619.29 | Fe Ⅰ | 4634.72 | Fe I | 4648.93 | Fe II |
| 4619.33 | Co Ⅰ | 4635.62 | Fe I p | 4649.46 | Gr I |
| 4619.52 | Cr I | 4635.85 | Fe I | 4649.54 | Gr I |
| 4619.55 | Cr I | 4636.34 | Ti II | 4650.02 | Ti I |
| 4619.77 | V I | 4637.42 | La II | 4650.04 | Fe II p |
| 4619.87 | La II | 4637.18 | Cr I | 4651.28 | Gr I |
| 4620.38 | Ni I | 4637.21 | Cr I | 1651.52 | Pr II |
| 4620.51 | Fe II | 4637.21 | Ti I | 4652.16 | Gr I |
| 4621.89 | Cr I | 4637.51 | Fe I | 4653.49 | Fe I p |
| 4621.96 | Cr I | 4637.77 | Cr I | 4654.50 | Fe I |
| 4611.96 | Cr I | 4637.77 | Cr I | 4654.63 | Fe I |
| 4612.40 | Fe II p | 4637.89 | Ti I | 4654.63 | Fe I |
| 4622.49 | Cr I | 4638.02 | Fe I | 4655.13 | Sm II |
| 4622.76 | Cr I | 1639.00 | Gd II | 4655.49 | La II |
| 4623.10 | Ti I | 1639.00 | Gd II | 4655.66 | Ni I |
| 4624.40 | V I | 4639.37 | Ti I | 4655.71 | Ti I |
| 4624.90 | Ce II | 4639.54 | Gr I | 4656.05 | Ti I |
| 4625.05 | Fe I | 4639.67 | Ti I | 4656.47 | Ti I |
| 4625.77 | Co I | 4639.94 | Ti I | 4656.97 | Fe II |
| 4625.92 | Cr I | 4640.06 | V I | 4657.21 | Ti I |
| 4626.19 | Cr I | 4640.43 | Ti I | 4657.38 | Ni I |
| 4626.48 | V I | 4641.22 | Fe I p | 4657.39 | Co I |
| 4626.54 | Mn I | 4642.01 | Gr I | 4657.60 | Fe I |
| 4626.76 | Fe I | 4642.23 | Sm II | 4659.40 | Ce II |
| 4627.22 | Eu I | 4642.58 | Fe I p | 4660.93 | Fe I p |
| 4627.48 | V II | 4643.47 | Fe I | 4661.19 | Fe I p |
| 4628.16 | Ce II | 4643.69 | Y I | 4661.54 | Fe I |
| 4628.91 | Co I | 4645.19 | Ti I | 4661.88 | Eu I |
| 4629.07 | Zr II | 4645.28 | La II | 4661.98 | Fe I |
| 4629.29 | Ti II p | 4646.17 | Gr I | 4662.51 | La II |
| 4629.34 | Ti I | 4646.33 | Gd II | 4662.71 | Ti II p |
| 1429.34 | Fe II | 4646.40 | V I | 4663.18 | Fe I |
| 4629.36 | Co I | 4646.68 | Sm II | 4663.33 | Cr I |
| 4629.98 | Ni I p | 4646.81 | Gr I | 4663.40 | Co I |
| 4630.13 | Fe I | 4647.42 | Ni I p | 4663.70 | Fe II |
| 4632.14 | Fe I p | 4647.44 | Fe I | 4663.83 | Cr I |
| 4632.18 | Cr I | 4647.50 | La II | 4664.79 | Fe II p |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4664.80 | Cr I | 4680.14 | ZnⅠ | 4693.63 | Sm |
| 4665.80 | Fe II p | 4680.30 | FeⅠ | 4693.67 | Ti Ⅰ |
| 4665.90 | Cr I | 4680.48 | Fe Ⅰ | 4693.95 | Cr Ⅰ |
| 4666.15 | V I | 4680.49 | Cr Ⅰ | 4694.46 | C Ⅱ |
| 4666.21 | Cr I | 4680.73 | Nd Ⅱ | 4694.88 | Ce Ⅱ |
| 4666.51 | Cr I | 4680.87 | Cr Ⅰ | 4695.15 | Cr Ⅰ |
| 4666.75 | Fe II | 4681.47 | Fe Ⅰ | 4696.38 | C Ⅱ |
| 4666.80 | Th I | 4681.91 | Ti Ⅰ | 4696.71 | Se Ⅱ |
| 4666.99 | Ni I | 4682.12 | La Ⅱ | 4697.06 | Cr Ⅰ |
| 4667.18 | Cr I | 4682.32 | Y Ⅱ | 4697.40 | Cr Ⅰ |
| 4667.46 | Fe I | 4682.36 | Co Ⅰ | 4697.62 | Cr Ⅱ |
| 4667.58 | Ti I | 4682.58 | Fe Ⅰ | 4698.28 | Sc Ⅱ |
| 4667.77 | Ni I | 4683.57 | Fe Ⅰ | 4698.39 | Co Ⅰ |
| 4668.07 | Fe I p | 4684.46 | V iⅠ | 4698.41 | Ni Ⅰ |
| 4668.14 | Fe I | 4684.60 | Ce Ⅱ | 4698.46 | Cr Ⅰ |
| 4668.36 | Ti I | 4684.60 | Cr Ⅰ | 4698.62 | Cr Ⅰ |
| 4669.17 | Fe I | 4684.88 | C Ⅱ | 4698.62 | Cr Ⅰ |
| 4669.27 | V I | 4685.19 | Zr Ⅱ | 4698.77 | Ti Ⅰ |
| 4669.34 | Cr I | 4685.27 | Ca Ⅰ | 4699.34 | Sm Ⅱ |
| 4669.40 | Sm II | 4685.84 | Ce Ⅰ | 4699.62 | La Ⅱ |
| 4669.50 | Ce II | 4686.22 | Ni Ⅰ | 4700.17 | Fe Ⅰ |
| 4669.65 | Sm II | 4687.18 | Sm Ⅱ | 4701.05 | Fe Ⅰ |
| 4670.17 | Fe I | 4687.30 | Fe Ⅰ | 4701.34 | Ni Ⅰ |
| 4670.40 | Sc II | 4687.39 | Fe Ⅰ | 4701.54 | Ni Ⅰ |
| 4670.48 | V I | 4687.67 | Fe Ⅰ | 4701.90 | Fe Ⅰ |
| 4671.69 | Mn I | 4687.80 | Zr Ⅰ | 4702.98 | Mg Ⅰ |
| 4673.17 | Fe I | 4688.38 | Fe Ⅰ | 4703.58 | Nd Ⅱ |
| 4673.28 | Fe I p | 4688.39 | Ti Ⅰ | 4703.81 | Ni Ⅰ |
| 4674.60 | Sm II | 4688.45 | Zr Ⅰ | 4704.40 | Sm Ⅱ |
| 4674.65 | Fe Ⅰ | 4688.65 | La Ⅱ | 4704.96 | Fe Ⅰ |
| 4674.83 | Y Ⅰ | 4689.37 | Cr Ⅰ | 4705.25 | C Ⅱ |
| 4675.12 | Ti Ⅰ | 4689.46 | Ti Ⅱ | 4705.46 | Fe Ⅰ |
| 4675.64 | Ni Ⅰ | 4690.15 | Fe Ⅰ | 4705.93 | Ni Ⅰ |
| 4676.91 | SmⅡ | 4690.38 | Fe Ⅰ | 4706.18 | V Ⅰ |
| 4677.53 | Co Ⅰ | 4691.17 | La Ⅱ | 4706.54 | Nd Ⅱ |
| 4677.59 | Fe Ⅰ | 4691.34 | Ti Ⅰ | 4706.57 | V Ⅰ |
| 4678.41 | Fe Ⅰ | 4691.41 | Fe Ⅰ | 4706.82 | C Ⅱ |
| 4678.85 | Fe Ⅰ | 4691.55 | Fe Ⅱ | 4707.28 | Fe Ⅰ |
| 4679.23 | Fe Ⅰ | 4692.50 | La Ⅱ | 4707.49 | Fe Ⅰ |
| 4679.96 | Fe Ⅰ | 4692.65 | C Ⅱ | 4707.54 | Pr Ⅱ |
| 4680.13 | Ce Ⅱ | 4693.19 | Co Ⅰ | 4707.75 | Cr Ⅰ |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4708.66 | Ti Ⅱ | 4727.94 | Co I | 4741.08 | Fe I |
| 4709.71 | Nd | 4728.17 | Fe I | 4741.09 | Cr I |
| 4710.08 | Zr Ⅰ | 4728.47 | Gd II | 4741.53 | Fe I |
| 4711.49 | Fe Ⅰ | 4728.55 | Fe I | 4742.63 | V I |
| 4712.07 | Ni Ⅰ | 4729.03 | Fe I | 4742.79 | Ti I |
| 4713.14 | He Ⅰ | 4729.23 | Sc I | 4742.93 | Fe I p |
| 4714.00 | Ge Ⅱ | 4729.70 | Fe I | 4743.08 | La II |
| 4714.07 | Fe Ⅰ | 4729.86 | Cr I | 4743.11 | Cr I |
| 4714.11 | V Ⅰ | 4730.03 | Mg I | 4743.81 | Sc I |
| 4714.42 | Ni Ⅰ | 4730.71 | Cr I | 4744.39 | Fe I |
| 4714.53 | C Ⅱ | 4731.00 | Mg I | 4744.92 | Pr II |
| 4714.73 | C Ⅱ | 4731.17 | Ti I | 4745.68 | Sm II |
| 4714.83 | Ce Ⅱ | 4731.36 | Hf II | 4745.81 | Fe I |
| 4715.30 | Ti Ⅰ | 4731.44 | Fe II | 4745.81 | Fe I |
| 4715.59 | Nd Ⅱ | 4731.81 | Ni I | 4746.64 | V I |
| 4715.78 | Ni Ⅰ | 4732.34 | Zr I | 4746.92 | Pr II |
| 4715.90 | V Ⅰ | 4732.47 | Ni I | 4747.26 | Ti I |
| 4716.13 | Sc Ⅱ | 4732.60 | Gd II | 4747.94 | Na I |
| 4716.44 | La Ⅱ | 4732.96 | Ti II p | 4748.12 | Sc II p |
| 4716.58 | Gd Ⅱ | 4733.43 | Ti I | 4748.73 | La II |
| 4716.85 | Fe Ⅰ | 4733.60 | Fe I | 4749.25 | Fe I p |
| 4717.58 | La Ⅱ | 4734.09 | Sc I | 4749.25 | Cr I |
| 4719.93 | La Ⅱ | 4734.10 | Fe I | 4749.68 | Co I |
| 4721.00 | Fe Ⅰ | 4734.43 | Gd I | 4749.93 | Fe I |
| 4721.00 | Fe Ⅰ | 4734.43 | C 2 | 4750.49 | V I |
| 4721.14 | Cr Ⅰ | 4734.83 | Co I | 4751.09 | Fe I |
| 4722.16 | Zn Ⅰ | 4735.75 | Hf II | 4751.57 | V I |
| 4722.28 | Sr Ⅰ | 4735.85 | Fe I | 4751.82 | Na I |
| 4722.60 | Ti Ⅰ | 4736.13 | Cr I | 4752.08 | Cr I |
| 4722.74 | Cr Ⅰ | 4736.50 | Ni I | 4752.12 | Na I |
| 4723.18 | Cr I | 4736.78 | Fe I | 4752.43 | Na I |
| 4724.07 | Fe II p | 4736.96 | Er II | 4753.96 | V I |
| 4724.42 | Cr I | 4737.35 | Cr I | 4754.04 | Mn I |
| 4724.42 | La II | 4737.63 | Fe I | 4754.36 | Ca I |
| 4725.46 | C 2 | 4737.64 | Sc I | 4754.38 | Ti I |
| 4725.58 | C 2 | 4739.48 | Zr I | 4754.74 | Cr I |
| 4725.94 | Fe I | 4739.49 | Ce II | 4754.77 | Ni I |
| 4726.16 | Fe I | 4740.16 | Ni II | 4755.14 | Cr I |
| 4727.15 | Cr I | 4740.27 | La II | 4755.73 | Mn II |
| 4727.41 | Fe I | 4740.34 | Fe I | 4756.11 | Cr I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4756.72 | Co I | 4768.40 | Fe I | 4786.91 | Gd Ⅱ |
| 4757.50 | V I | 4768.77 | Ce II | 4787.74 | Cr Ⅰ |
| 4757.58 | Fe I | 4769.78 | Ti I | 4787.84 | Fe Ⅰ |
| 4757.58 | Fe I | 4771.11 | Co I | 4788.69 | Zr Ⅰ |
| 4757.59 | Cr I | 4771.57 | Cr I | 4788.76 | Fe Ⅰ |
| 4758.12 | Ti I | 4771.70 | Fe I | 4789.35 | Cr Ⅰ |
| 4758.42 | Ni I | 4772.32 | Zr I | 4789.65 | Fe Ⅰ |
| 4758.74 | V I | 4772.82 | Fe I | 4790.34 | Cr Ⅰ |
| 4759.27 | Ti I | 4772.82 | Fe I | 4790.34 | Cr Ⅰ |
| 4760.07 | Fe I p | 4773.41 | Ni Ⅰ | 4791.00 | Ni Ⅰ |
| 4760.15 | Fe II p | 4773.52 | Fe Ⅰ | 4791.15 | Gd Ⅱ |
| 4760.98 | Y I | 4773.94 | Ce Ⅱ | 4791.25 | Fe Ⅰ |
| 4761.42 | Cr II | 4774.56 | Cr Ⅰ | 4791.50 | Sc Ⅰ |
| 4761.53 | Mn I | 4775.14 | Cr Ⅰ | 4791.58 | Sm Ⅱ |
| 4761.67 | Zr II | 4775.53 | Cr Ⅰ | 4792.39 | Ti Ⅱ |
| 4761.73 | Cr I | 4776.31 | Co Ⅰ | 4792.48 | Ti Ⅰ |
| 4762.38 | Mn I | 4776.34 | Fe Ⅰ | 4792.51 | Cr Ⅰ |
| 4762.63 | Ni I | 4776.36 | V Ⅰ | 4792.85 | Co Ⅰ |
| 4762.73 | Pr II | 4776.52 | V Ⅰ | 4794.36 | Fe Ⅰ |
| 4762.78 | Zr I | 4777.85 | Sm Ⅱ | 4795.84 | Ni Ⅰ |
| 4762.77 | Ti II | 4778.25 | Ti Ⅰ | 4795.85 | Co Ⅰ |
| 4763.62 | Nd II | 4779.35 | Sc Ⅰ | 4796.17 | Cr Ⅰ |
| 4763.84 | Ti II p | 4779.44 | Fe Ⅰ | 4796.21 | Ti Ⅰ |
| 4763.86 | Nd II | 4779.98 | Co Ⅰ | 4796.84 | Cr Ⅰ |
| 4763.95 | Ni I | 4779.99 | Ti Ⅱ | 4796.93 | V Ⅰ |
| 4764.29 | Cr I | 4781.43 | Co Ⅰ | 4797.16 | Nd Ⅱ |
| 4764.54 | Ti II | 4781.72 | Fe Ⅰ | 4797.69 | Cr Ⅰ |
| 4764.64 | Cr I | 4782.79 | Ni Ⅰ | 4797.97 | V Ⅰ |
| 4765.48 | Fe I | 4783.06 | V Ⅰ | 4797.98 | Ti Ⅰ |
| 4765.78 | Hf II | 4783.42 | Ni Ⅰ | 4798.27 | Fe Ⅰ |
| 4765.86 | Mn I | 4783.69 | Y Ⅱ | 4798.54 | Ti Ⅱ |
| 4766.43 | Mn I | 4783.94 | Ce Ⅱ | 4798.74 | Fe Ⅰ |
| 4766.63 | Cr I | 4784.32 | Sr Ⅰ | 4799.41 | Fe Ⅰ |
| 4766.64 | V I | 4784.94 | Zr Ⅰ | 4799.79 | V Ⅰ |
| 4766.66 | Cr I p | 4785.07 | Ce Ⅰ | 4799.80 | Ti Ⅰ |
| 4766.87 | Fe I p | 4785.96 | Fe Ⅰ | 4799.83 | Ni Ⅰ |
| 4767.28 | Cr I | 4786.29 | Ni Ⅰ | 4799.86 | Gd Ⅱ |
| 4767.30 | Ti II p | 4786.52 | V Ⅰ | 4800.14 | Fe Ⅰ |
| 4767.86 | Cr I | 4786.54 | Ni Ⅰ | 4800.55 | Fe Ⅰ |
| 4768.07 | Co I | 4786.58 | Y Ⅱ | 4800.65 | Fe Ⅰ |
| 4768.33 | Fe I | 4786.81 | Fe Ⅰ | 4801.03 | Cr Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4801.05 | Gd Ⅱ | 4815.81 | Sm Ⅱ | 4832.73 | Fe Ⅰ |
| 4802.53 | Fe Ⅰ | 4815.92 | Ni Ⅰ | 4832.73 | Fe Ⅰ |
| 4802.58 | Gd Ⅱ | 4816.67 | Fe Ⅰ | 4833.03 | V Ⅰ |
| 4802.88 | Fe Ⅰ | 4817.22 | Hf Ⅱ | 4833.21 | Fe Ⅱ |
| 4802.88 | Fe Ⅰ | 4817.77 | Fe Ⅰ | 4834.23 | Gd Ⅱ |
| 4803.54 | Gd Ⅱ | 4817.85 | Ni Ⅰ | 4834.36 | Co Ⅰ |
| 4804.04 | La Ⅱ | 4818.03 | Fe Ⅰ | 4834.51 | Fe Ⅰ |
| 4804.53 | Fe Ⅰ | 4818.26 | Fe Ⅱ | 4835.68 | Cr Ⅰ |
| 4805.10 | Ti Ⅱ | 4819.53 | Ti Ⅰ | 4835.86 | Fe Ⅰ |
| 4805.24 | Cr Ⅰ | 4820.34 | Nd Ⅱ | 4835.98 | Nd Ⅱ |
| 4805.42 | Ti Ⅰ | 4820.41 | Ti Ⅰ | 4836.18 | Cr Ⅰ |
| 4805.88 | Zr Ⅰ | 4821.14 | Ni Ⅰ | 4836.22 | Cr Ⅱ |
| 4806.33 | Ti Ⅰ | 4822.06 | Cr Ⅰ | 4836.27 | Ni Ⅰ |
| 4807.00 | Ni Ⅰ | 4822.66 | Fe Ⅰ | 4836.86 | Cr Ⅰ |
| 4807.14 | Hf Ⅱ | 4823.31 | Y Ⅱ | 4837.82 | C2 |
| 4807.54 | V Ⅰ | 4823.40 | V Ⅱ | 4838.09 | Fe Ⅰ |
| 4807.72 | Fe Ⅰ | 4823.52 | Mn Ⅰ | 4838.52 | Fe Ⅰ |
| 4808.16 | Fe Ⅰ | 4824.05 | La Ⅱ | 4838.65 | Ni Ⅰ |
| 4808.52 | Ni Ⅰ | 4824.13 | Cr Ⅱ | 4839.55 | Fe Ⅰ |
| 4808.53 | Ti Ⅰ | 4824.16 | Fe Ⅰ | 4839.62 | Gd Ⅱ |
| 4808.86 | Ni Ⅰ | 4824.29 | Zr Ⅰ | 4840.00 | Fe Ⅱ |
| 4809.00 | La Ⅱ | 4825.45 | Ti Ⅰ | 4840.02 | La Ⅱ |
| 4809.47 | Zr Ⅰ | 4825.48 | Nd Ⅱ | 4840.22 | Cr Ⅰ |
| 4809.94 | Fe Ⅰ | 4825.51 | Cr Ⅰ | 4840.25 | Co Ⅰ |
| 4810.53 | Zn Ⅰ | 4825.71 | Fe Ⅱ | 4840.33 | Fe Ⅰ |
| 4810.73 | Cr Ⅰ | 4827.46 | V Ⅰ | 4840.87 | Ti Ⅰ |
| 4811.04 | Fe Ⅰ | 4827.60 | Ti Ⅰ | 4841.65 | Fe Ⅰ |
| 4811.07 | Ti Ⅰ | 4828.05 | Zr Ⅰ | 4841.67 | Ni Ⅰ |
| 4811.14 | V Ⅱ | 4828.66 | Cr Ⅰ | 4841.73 | Cr Ⅰ |
| 4811.34 | Nd Ⅱ | 4829.03 | Ni Ⅰ | 4841.80 | Fe Ⅰ |
| 4811.88 | Sr Ⅱ | 4829.38 | Cr Ⅰ | 4842.78 | Fe Ⅰ |
| 4812.00 | Ni Ⅰ | 4829.38 | Cr Ⅰ | 4843.16 | Fe Ⅰ |
| 4812.24 | Ti Ⅰ | 4839.57 | Sm Ⅱ | 4843.17 | Ni Ⅰ |
| 4812.35 | Cr Ⅱ | 4830.40 | Fe Ⅱ | 4843.39 | Fe Ⅰ |
| 4813.11 | Fe Ⅰ | 4831.18 | Ni Ⅰ | 4843.99 | Ti Ⅰ |
| 4813.28 | Co Ⅰ | 4831.63 | Cr Ⅰ | 4844.02 | Fe Ⅰ |
| 4813.95 | V Ⅱ | 4831.64 | V Ⅰ | 4844.21 | Sm |
| 4814.27 | Cr Ⅰ | 4832.07 | Ti Ⅰ | 4844.31 | V |
| 4814.37 | Fe Ⅰ | 4832.08 | Sr Ⅰ | 4845.17 | Ni Ⅰ |
| 4814.62 | Ni Ⅰ | 4832.43 | V Ⅰ | 4845.66 | Fe Ⅰ |
| 4815.62 | Zr Ⅰ | 4832.70 | Ni Ⅰ | 4845.66 | Fe Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4845.67 | Y Ⅰ | 4861.84 | Cr Ⅰ | 4875.36 | C2 |
| 4846.29 | Cr Ⅰ | 4862.54 | Fe Ⅰ | 4875.46 | V Ⅰ |
| 4846.47 | Fe | 4862.60 | Fe Ⅰ | 4875.89 | Fe Ⅰ |
| 4847.30 | Ca Ⅰ | 4863.65 | Fe Ⅰ | 4875.97 | Gd Ⅱ |
| 4847.61 | Fe Ⅱ | 4863.75 | Ti Ⅰ | 4876.19 | Fe Ⅰ |
| 4847.76 | Sm Ⅱ | 4863.78 | Fe Ⅰ | 4876.41 | Cr Ⅱ |
| 4847.76 | Cr Ⅰ | 4863.93 | Ni Ⅰ | 4876.48 | Cr Ⅱ |
| 4848.24 | Cr Ⅱ | 4864.19 | Ti Ⅰ | 4877.61 | Fe Ⅰ |
| 4848.46 | Hf Ⅱ | 4864.28 | Ni Ⅰ | 4878.05 | Gd Ⅱ |
| 4848.49 | Ti Ⅰ | 4864.32 | Cr | 4878.13 | Ca Ⅰ |
| 4848.90 | Fe Ⅰ | 4864.74 | V Ⅰ | 4878.22 | Fe Ⅰ |
| 4849.12 | Ni Ⅰ | 4864.83 | V Ⅰ | 4880.25 | Co Ⅰ |
| 4849.18 | Ti Ⅱ | 4865.02 | Gd | 4880.56 | V Ⅰ |
| 4849.67 | Fe Ⅰ | 4865.62 | Ti Ⅱ | 4880.92 | Ti Ⅰ |
| 4851.36 | Zr Ⅰ | 4866.27 | Ni Ⅰ | 4881.55 | V Ⅰ |
| 4851.47 | Cr Ⅰ | 4866.77 | Fe Ⅰ | 4881.73 | Fe Ⅰ |
| 4851.48 | V Ⅰ | 4867.53 | Fe Ⅰ | 4881.73 | Fe Ⅰ |
| 4851.99 | Tm Ⅱ | 4867.87 | Co Ⅰ | 4882.15 | Fe Ⅰ |
| 4852.56 | Ni Ⅰ | 4868.05 | Dy Ⅱ | 4882.18 | V Ⅰ |
| 4852.69 | Y Ⅰ | 4868.26 | Ti Ⅰ | 4882.46 | Ce Ⅱ |
| 4853.30 | Ni Ⅰ | 4868.38 | Fe Ⅰ | 4883.69 | Y Ⅱ |
| 4853.74 | Ni Ⅰ | 4868.82 | Fe Ⅱ | 4884.06 | V Ⅱ |
| 4853.89 | C2 | 4870.05 | Fe Ⅰ | 4884.57 | CrⅡ |
| 4854.65 | Zr Ⅱ | 4870.13 | Ti Ⅰ | 4884.95 | Cr Ⅰ |
| 4854.73 | Ti Ⅰ | 4870.41 | C2 | 4885.08 | Ti Ⅰ |
| 4854.87 | Y Ⅱ | 4870.47 | C2 | 4885.44 | Fe Ⅰ |
| 4854.89 | Fe Ⅰ | 4870.80 | Cr Ⅰ | 4885.78 | Cr Ⅰ |
| 4855.41 | Ni Ⅰ | 4870.84 | Ni Ⅰ | 4885.96 | Cr Ⅰ |
| 4855.68 | Fe Ⅰ | 4871.27 | Fe Ⅱ | 4886.17 | Fe Ⅰ |
| 4856.01 | Ti Ⅰ | 4871.32 | Fe Ⅰ | 4886.34 | Fe Ⅰ |
| 4856.19 | Cr Ⅱ | 4871.94 | Fe Ⅰ | 4886.82 | V Ⅰ |
| 4857.38 | Ni Ⅰ | 4872.14 | Fe Ⅰ | 4886.99 | N Ⅰ |
| 4858.24 | Fe Ⅰ | 4872.91 | Fe Ⅰ | 4887.01 | Cr Ⅰ |
| 4858.27 | Fe Ⅰ | 4873.27 | Ni Ⅰ | 4887.19 | Fe Ⅰ |
| 4859.03 | Nd Ⅱ | 4873.44 | Ni Ⅰ | 4887.37 | Fe Ⅰ |
| 4859.12 | Fe Ⅰ | 4873.74 | Fe Ⅰ | 4887.72 | Zr Ⅰ |
| 4859.66 | C2 | 4874.03 | Ti Ⅱ | 4887.73 | Cr Ⅰ |
| 4859.75 | Fe Ⅰ | 4874.35 | Fe Ⅰ | 4888.53 | Cr Ⅰ |
| 4860.20 | Cr Ⅱ | 4874.80 | V Ⅱ | 4888.54 | Gd Ⅱ |
| 4860.98 | Fe Ⅰ | 4874.81 | Ni Ⅰ | 4888.65 | Fe Ⅰ |
| 4861.33 | H4 Ⅰ | 4875.32 | Fe Ⅰ | 4889.01 | Fe Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4889.01 | Fe Ⅰ | 4916.84 | C2 | 4939.24 | Fe Ⅰ |
| 4889.11 | Fe Ⅰ | 4917.25 | Fe Ⅰ | 4939.69 | Fe Ⅰ |
| 4890.45 | Ni Ⅰ | 4918.03 | Fe Ⅰ | 4941.56 | Ti Ⅰ |
| 4890.76 | Fe Ⅰ | 4918.36 | Ni Ⅰ | 4942.50 | Cr Ⅰ |
| 4891.50 | Fe Ⅰ | 4918.71 | Ni Ⅰ | 4942.59 | Fe Ⅰ |
| 4892.86 | Fe Ⅰ | 4919.00 | Fe Ⅰ | 4945.46 | Ni Ⅰ |
| 4893.44 | Y Ⅰ | 4919.87 | Ti Ⅰ | 4946.04 | Ni Ⅰ |
| 4893.78 | Fe | 4920.28 | Cr Ⅱ | 4946.39 | Fe Ⅰ |
| 4894.30 | Gd Ⅱ | 4920.51 | Fe Ⅰ | 4948.63 | Sm Ⅱ |
| 4894.43 | Zr Ⅱ | 4920.69 | Nd Ⅱ | 4950.11 | Fe Ⅰ |
| 4894.44 | Fe Ⅰ | 4920.95 | Cr Ⅰ | 4951.74 | Er Ⅱ |
| 4899.91 | Ti Ⅰ | 4920.98 | La Ⅱ | 4952.06 | La Ⅱ |
| 4899.92 | La Ⅱ | 4921.77 | Ti Ⅰ | 4952.33 | Ni Ⅰ |
| 4899.93 | Ba Ⅱ | 4921.80 | La Ⅱ | 4952.65 | Fe Ⅰ |
| 4900.13 | Y Ⅱ | 4921.93 | He Ⅰ | 4952.65 | Fe Ⅰ |
| 4900.62 | V Ⅰ | 4922.27 | Cr Ⅰ | 4953.20 | Ni Ⅰ |
| 4900.62 | Ti Ⅰ | 4923.58 | Gd Ⅱ | 4954.03 | Gd Ⅱ |
| 4900.97 | Ni Ⅰ | 4923.92 | Fe Ⅱ | 4954.81 | Cr Ⅰ |
| 4903.24 | Cr Ⅰ | 4924.78 | Fe Ⅰ | 4957.30 | Fe Ⅰ |
| 4903.32 | Fe Ⅰ | 4925.58 | Ni Ⅰ | 4957.60 | Fe Ⅰ |
| 4903.71 | Ti Ⅰ | 4925.66 | V Ⅰ | 4958.26 | Ti Ⅰ |
| 4904.29 | V Ⅰ | 4925.90 | Zr Ⅱ | 4958.79 | Gd Ⅱ |
| 4904.35 | V Ⅰ | 4927.42 | Fe Ⅰ | 4959.13 | Nd Ⅱ |
| 4904.41 | Vi Ⅰ | 4928.34 | Ti Ⅰ | 4961.40 | Nd Ⅱ |
| 4904.45 | V Ⅰ | 4930.33 | Fe Ⅰ | 4961.91 | Fe Ⅰ |
| 4904.51 | Hf Ⅱ | 4932.03 | V Ⅰ | 4961.94 | Sm Ⅱ |
| 4905.15 | Fe Ⅰ | 4933.19 | Fe Ⅰ | 4962.56 | Fe Ⅰ |
| 4907.74 | Fe Ⅰ | 4933.35 | Fe Ⅰ | 4964.93 | Cr Ⅰ |
| 4908.46 | Ti Ⅰ | 4934.02 | Fe Ⅰ | 4965.14 | Ni Ⅰ |
| 4909.39 | Fe Ⅰ | 4934.09 | Ba Ⅱ | 4965.37 | C2 |
| 4910.03 | Fe Ⅰ | 4934.83 | La Ⅱ | 4965.40 | V Ⅱ |
| 4910.33 | Fe Ⅰ | 4934.89 | Cr Ⅰ | 4965.88 | Mn Ⅰ |
| 4910.57 | Fe Ⅰ | 4935.83 | Ni Ⅰ | 4966.10 | Fe Ⅰ |
| 4910.84 | Gd Ⅱ | 4936.33 | Cr Ⅰ | 4966.80 | Cr Ⅰ |
| 4911.21 | Ti Ⅱ | 4937.34 | Ni Ⅰ | 4967.90 | Fe Ⅰ |
| 4911.34 | La Ⅱ | 4937.72 | Ti Ⅰ | 4968.57 | Ti Ⅰ |
| 4911.79 | Fe Ⅰ | 4938.10 | Sm Ⅱ | 4968.71 | Fe Ⅰ |
| 4912.03 | Ni Ⅰ | 4938.18 | Fe Ⅰ | 4969.93 | Fe Ⅰ |
| 4913.62 | TiⅠ | 4938.28 | Ti Ⅰ | 4970.39 | La Ⅱ |
| 4913.97 | Ni Ⅰ | 4938.82 | Fe Ⅰ | 4970.50 | Fe Ⅰ |
| 4914.38 | Nd Ⅱ | 4939.24 | Fe Ⅰ | 4970.66 | Fe Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 4971.35 | Ni Ⅰ | 5000.73 | Fe II p | 5058.00 | Fe I |
| 4973.05 | Ti Ⅰ | 5000.99 | Ti I | 5058.03 | Ni I |
| 4973.11 | Fe Ⅰ | 5001.87 | Fe I | 5058.50 | Fe I |
| 4974.47 | Co Ⅰ | 5002.12 | La II | 5059.93 | C 2 |
| 4975.34 | Ti Ⅰ | 5002.32 | V I | 5059.22 | C 2 |
| 4975.42 | Fe Ⅰ | 5002.80 | Fe I | 5050.08 | Fe I |
| 4976.16 | Ni Ⅰ | 5039.96 | Ti I | 5060.08 | Fe I |
| 4976.35 | Ni I | 5040.90 | Fe I | 5062.11 | Ti I |
| 4976.71 | Ni I p | 5040.90 | Fe I | 5062.38 | C 2 |
| 4977.65 | Fe I | 5041.07 | Fe I | 5062.86 | Gd II |
| 4977.73 | Ti I | 5041.32 | Fe I p | 5063.18 | C 2 |
| 4978.19 | Ti I | 5041.62 | Ca I | 5064.07 | Ti I |
| 4978.54 | Na I | 5041.76 | Fe I | 5064.65 | Ti I |
| 4978.61 | Fe I | 5040.20 | Ni I | 5064.95 | Fe I p |
| 4978.58 | Fe I | 5043.71 | C 2 | 5065.02 | Fe I |
| 4980.16 | Ni I | 5044.01 | Ce II | 5065.20 | Fe I |
| 4981.73 | Ti I | 5044.22 | Fe I | 5065.91 | Cr I |
| 4983.26 | Fe I | 5045.26 | C 2 | 5065.98 | Ti I |
| 4983.86 | Fe I | 5045.40 | Ti I | 5066.85 | C 2 |
| 1984.13 | Ni I | 5046.93 | C 2 | 5066.99 | La II |
| 4984.91 | Gd II | 5047.31 | V II | 5066.16 | Fe I |
| 4985.26 | Fe I | 5048.08 | Ni I | 5067.71 | Cr I |
| 4985.55 | Fe I | 5048.21 | Ti I | 5068.77 | Fe I |
| 4986.24 | Fe I | 5048.45 | Fe I | 5069.12 | Ti II |
| 4986.82 | La II | 5048.85 | Ni I | 5069.35 | Ti I |
| 4988.96 | Fe I | 5049.42 | C 2 | 5070.14 | C 2 |
| 4989.14 | Ti I | 5049.83 | Fe I | 5070.25 | Sc I |
| 4991.07 | Ti I | 5050.74 | C 2 | 5071.02 | Gd II |
| 4991.11 | Fe II p | 5050.88 | Gd II | 5071.48 | Ti I |
| 4991.28 | Fe I | 5051.53 | Ni I | 5072.08 | Fe I |
| 4991.86 | Fe I p | 5051.64 | Fe I | 5072.30 | Ti II |
| 4993.36 | Fe II | 5051.90 | Cr I | 5072.69 | Fe I |
| 4993.69 | Fe I | 5052.74 | C 2 | 5072.92 | Cr I |
| 4994.13 | Fe I | 5052.76 | Sm II | 5073.46 | C 2 |
| 4996.85 | Ni I | 5052.88 | Ti I | 5074.76 | Fe I |
| 4997.10 | Ti I | 5054.65 | Fe I | 5074.98 | C 2 |
| 4998.23 | Ni I | 5056.00 | Fe I | 5075.30 | Ce II |
| 4999.11 | Fe I | 5056.02 | Si II | 5076.29 | Fe I |
| 4999.46 | La II | 5056.12 | C 2 | 5076.32 | Ni I |
| 4999.50 | Ti I | 5056.25 | C 2 | 5076.61 | C 2 |
| 5000.34 | Ni I | 5056.86 | Fe I | 5076.76 | C 2 |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5078.36 | C 2 | 5097.00 | Fe I | 5110.75 | Cr I |
| 5078.42 | C 2 | 5097.49 | C 2 | 5110.75 | C 2 |
| 5079.00 | Fe I | 5097.71 | C 2 | 5110.77 | Pr II |
| 5079.23 | Fe I | 5098.14 | C 2 | 5111.61 | C 2 |
| 5079.68 | Ce II | 5098.30 | C 2 | 5111.74 | C 2 |
| 5079.74 | Fe I | 5098.38 | Gd II | 5111.87 | C 2 |
| 5079.96 | Ni I | 5098.59 | Fe I | 5112.28 | Zr II |
| 5080.09 | C 2 | 5098.70 | Fe I | 5113.13 | Cr I |
| 5080.52 | Ni I | 5099.09 | Fe I | 5113.23 | Ca I |
| 5081.11 | Ni I | 5099.23 | Sc I | 5113.45 | Ti I |
| 5081.55 | Sc I | 5099.32 | Ni I | 5114.52 | Fe I p |
| 5082.35 | Ni I | 5099.58 | C 2 | 5114.55 | La II |
| 5083.13 | C 2 | 5099.95 | Ni I | 5115.40 | Ni I |
| 5083.34 | Fe I | 5100.66 | Fe II p | 5115.79 | Fa I |
| 5083.71 | Sc I | 5100.84 | Fe II | 5116.06 | Cr II |
| 5084.08 | Ni I | 5100.94 | Gd II | 5116.19 | C 2 |
| 5084.55 | Fe I p | 5100.95 | Fe II | 5116.66 | C 2 |
| 5084.70 | C 2 | 5101.48 | Fe II | 5116.76 | C 2 |
| 5085.33 | Ti I | 5101.49 | C 2 | 5116.90 | C 2 |
| 5085.48 | Ni I | 5102.45 | C 2 | 5117.94 | Mn I |
| 5085.55 | Sc I | 5102.97 | Ni I | 5118.18 | C 2 |
| 5086.25 | C 2 | 5103.18 | C 2 | 5119.12 | Y II |
| 5086.40 | C 2 | 5103.74 | C 2 | 5119.13 | C 2 |
| 5087.06 | Ti I | 5104.03 | Cr II p | 5119.21 | C 2 |
| 5087.42 | Y II | 5104.21 | Fe I | 5119.38 | C 2 |
| 5088.16 | Fe I p | 5104.47 | Fe I | 5119.34 | Fe II p |
| 5088.96 | Ni I | 5105.21 | Nd II | 5120.42 | Ti I |
| 5089.22 | C 2 | 5105.54 | Cu I | 5120.64 | C 2 |
| 5089.35 | C 2 | 5106.39 | C 2 | 5120.71 | C 2 |
| 5089.84 | Nd II | 5106.46 | C 2 | 5120.89 | Fe I p |
| 5090.79 | Fe I | 5107.45 | Fe I | 5121.57 | Ni I |
| 5091.49 | C 2 | 5107.65 | Fe I | 5121.65 | Fe I |
| 5091.89 | Cr I | 5108.91 | Gd II | 5122.77 | Co I |
| 5092.25 | Gd II | 5109.12 | C 2 | 5122.99 | La II |
| 5092.29 | C 2 | 5109.30 | C 2 | 5123.21 | Y II |
| 5092.45 | C 2 | 5109.66 | Fe I | 5123.47 | Cr I |
| 5092.80 | Nd II | 5100.36 | Fe I p | 5123.72 | Fe I |
| 5094.42 | Ni I | 5110.38 | Pr II | 5124.05 | Fe II p |
| 5095.18 | C 2 | 5110.41 | Fe I | 5124.60 | Fe I p |
| 5095.34 | C 2 | 5110.61 | Hf II | 5125.13 | Fe I |
| 5096.87 | Ni I | 5110.63 | C 2 | 5125.21 | Ni I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5125.48 | C 2 | 5141.75 | Fe I | 5157.76 | C2 |
| 5126.20 | Co I | 5141.90 | C 2 | 5157.99 | Ni Ⅰ |
| 5126.22 | Fe I | 5142.54 | Fe I | 5158.53 | C2 |
| 5127.36 | Fe I | 5142.54 | Fe I | 5158.85 | Co Ⅰ |
| 5127.37 | Ni I | 5142.77 | Ni I | 5159.07 | Fe Ⅰ |
| 5127.68 | Fe I p | 5142.93 | Fe I | 5159.35 | V Ⅰ |
| 5127.87 | Fe II | 5142.98 | Ni I | 5159.47 | C2 |
| 5128.03 | Ni I | 5143.73 | Fe I p | 5160.21 | C2 |
| 5128.32 | C 2 | 5143.86 | C 2 | 5160.39 | C2 |
| 5129.14 | Ti II | 5144.58 | C 2 | 5160.82 | Fe Ⅱ |
| 5129.38 | Ni I | 5144.67 | Cr I | 5161.18 | Fe Ⅱ |
| 5129.52 | Pr II | 5145.10 | Fe I | 5161.77 | Cr Ⅰ |
| 5129.66 | Fe I | 5145.47 | Ti I | 5161.85 | C2 |
| 5130.28 | Gd II | 5145.65 | A I II | 5162.29 | Fe Ⅰ |
| 5130.39 | Ni I | 5146.12 | Fe II p | 5162.93 | Ni Ⅰ |
| 5130.60 | Nd II | 5146.48 | Ni I | 5163.42 | C2 |
| 5131.28 | Ti II p | 5146.75 | Co Ⅰ | 5163.61 | La Ⅱ |
| 5131.48 | Fe I | 5147.48 | Ti Ⅰ | 5163.81 | C2 |
| 5131.58 | C 2 | 5147.69 | C2 | 5164.26 | C2 |
| 5131.77 | Ni I | 5148.06 | Fe Ⅰ | 5164.38 | C2 |
| 5132.33 | Nd II | 5148.23 | Fe Ⅰ | 5164.54 | Gd Ⅱ |
| 5132.36 | C 2 | 5149.13 | Mn Ⅰ | 5164.56 | Fe Ⅰ |
| 5132.50 | C 2 | 5149.22 | C2 | 5164.56 | Hf Ⅱ |
| 5132.67 | Fe II p | 5149.80 | Co Ⅰ | 5164.56 | Fe Ⅰ |
| 5132.93 | Ti I | 5150.56 | C2 | 5164.56 | Hf Ⅱ |
| 5133.47 | Co I | 5150.84 | Fe Ⅰ | 5164.90 | C2 |
| 5133.69 | Fe I | 5150.89 | Mn Ⅰ | 5164.92 | Fe Ⅰ |
| 5134.32 | C 2 | 5150.93 | Fe Ⅱ | 5165.14 | Nd Ⅱ |
| 5134.52 | C 2 | 5151.92 | Fe Ⅰ | 5165.16 | Co Ⅰ |
| 5135.58 | C 2 | 5152.19 | Ti Ⅰ | 5165.42 | Fe Ⅰ |
| 5136.09 | Fe I | 5153.23 | Cu Ⅰ | 5166.23 | Cr Ⅰ |
| 5137.08 | Ni I | 5153.49 | Cr Ⅱ | 5166.29 | Fe Ⅰ |
| 5137.39 | Fe I | 5154.06 | Ti Ⅱ | 5167.32 | M gⅠ |
| 5137.59 | C 2 | 5154.40 | Fe Ⅱ | 5167.49 | Fe Ⅰ |
| 5138.71 | Cr I | 5155.14 | Ni Ⅰ | 5167.96 | Cr Ⅰ |
| 5139.26 | Ni I | 5155.52 | C2 | 5168.18 | Fe Ⅰ |
| 5139.26 | Fe I | 5155.76 | Ni Ⅰ | 5168.19 | Fe Ⅰ |
| 5139.47 | Fe I | 5156.56 | C2 | 5168.66 | Ni Ⅰ |
| 5139.65 | Cr I | 5156.74 | La Ⅱ | 5168.90 | Fe Ⅰ |
| 5139.93 | C 2 | 5156.76 | Gd Ⅱ | 5169.03 | Fe Ⅱ |
| 5141.22 | C 2 | 5157.60 | C2 | 5170.77 | Fe Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5171.60 | Fe Ⅰ | 5192.52 | Ni Ⅰ | 5217.40 | Fe I |
| 5172.68 | Mg Ⅰ | 5192.97 | Ti Ⅰ | 5217.93 | Fe I |
| 5173.49 | Fe Ⅰ | 5193.49 | Cr Ⅰ | 5218.20 | Cu I |
| 5173.74 | Ti Ⅰ | 5193.89 | FeⅢ | 5219.70 | Ti I |
| 5173.90 | Pr Ⅱ | 5194.94 | Fe Ⅰ | 5220.11 | Pr II |
| 5176.09 | Co Ⅰ | 5195.11 | Pr Ⅱ | 5220.31 | Ni I |
| 5176.57 | Ni Ⅰ | 5195.31 | Pr Ⅱ | 5221.75 | Cr I |
| 5176.77 | V Ⅰ | 5195.47 | Fe Ⅰ | 5222.39 | Cr I |
| 5176.79 | Nd Ⅱ | 5196.10 | Fe Ⅰ | 5222.40 | Fe I p |
| 5177.23 | Fe Ⅰ | 5196.43 | Y Ⅱ | 5222.68 | Cr I |
| 5177.43 | Cr Ⅰ | 5196.44 | Cr Ⅰ | 5222.68 | Ti I |
| 5177.83 | Cr Ⅰ | 5196.57 | Cr Ⅰ | 5223.19 | Fe I |
| 5178.10 | Gd Ⅱ | 5196.59 | Mn Ⅰ | 5224.08 | Cr I |
| 5178.80 | Fe Ⅰ | 5197.17 | Ni Ⅰ | 5224.30 | Ti I |
| 5178.84 | Gd Ⅱ | 5197.57 | Fe Ⅱ | 5224.93 | Ti I |
| 5179.14 | Ni Ⅰ | 5197.93 | Fe Ⅰ | 5224.94 | Cr I |
| 5179.78 | Nd Ⅱ | 5198.71 | Fe Ⅰ | 5225.03 | Cr I |
| 5180.07 | Fe Ⅰ | 5200.19 | Cr Ⅰ | 5225.53 | Fe I |
| 5181.97 | Fe Ⅱ | 5200.42 | Y Ⅱ | 5225.82 | Cr I |
| 5183.42 | La Ⅱ | 5201.10 | Ti Ⅰ | 5226.06 | Fe I p |
| 5183.60 | Mg Ⅰ | 5202.27 | Fe Ⅰ | 5226.53 | Ti II |
| 5183.72 | Ti Ⅱ | 5202.34 | Fe Ⅰ | 5226.87 | Fe I |
| 5184.29 | Fe Ⅰ | 5204.52 | Cr Ⅰ | 5226.89 | Cr I |
| 5184.58 | Ni Ⅰ | 5204.58 | Fe Ⅰ | 5227.15 | Fe I |
| 5184.59 | Cr Ⅰ | 5205.73 | Y Ⅱ | 5227.19 | Fe I |
| 5185.90 | Ti Ⅱ | 5206.04 | Cr Ⅰ | 5228.08 | Cr I |
| 5186.33 | Ti Ⅰ | 5206.52 | Cr Ⅰ | 5228.41 | Fe I |
| 5186.59 | Ni Ⅰ | 5206.56 | Pr Ⅱ | 5228.43 | Nd II |
| 5187.24 | Gd Ⅱ | 5207.85 | Ti Ⅰ | 5229.86 | Fe I |
| 5187.45 | Ce Ⅱ | 5207.95 | Fe Ⅰ | 5229.86 | Fe I |
| 5187.92 | Fe Ⅰ | 5208.44 | Cr Ⅰ | 5230.21 | Co I |
| 5188.70 | Ti Ⅰ | 5208.60 | Fe Ⅰ | 5232.50 | Cr II |
| 5188.85 | Ca Ⅰ | 5210.39 | Ti Ⅰ | 5232.95 | Fe I |
| 5191.08 | Gd Ⅱ | 5210.49 | Gd II | 5234.09 | V I |
| 5191.45 | Nd Ⅱ | 5211.54 | Ti II | 5234.20 | Nd II |
| 5191.46 | Fa Ⅰ | 5212.37 | Nd II | 5234.62 | Fe II |
| 5191.58 | Fe Ⅱ | 5212.70 | Co I | 5235.19 | Co I |
| 5191.59 | V Ⅱ | 5214.64 | Cr I | 5235.39 | Fe I |
| 5191.60 | Zr Ⅱ | 5215.18 | Fe I | 5235.39 | Fe I |
| 5192.00 | Cr Ⅰ | 5215.29 | Cr I | 5234.45 | Ni I |
| 5192.35 | Fe Ⅰ | 5216.28 | Fe I | 5236.19 | Fe I |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5237.34 | Cr II | 5260.38 | Co I | 5275.00 | Fe I |
| 5237.35 | Cr I | 5260.77 | Mn I | 5275.17 | Cr I |
| 5238.56 | Ti I | 5261.71 | Ca I | 5275.69 | Cr I |
| 5238.56 | Ti I | 5261.75 | Cr I | 5275.99 | Fe II |
| 5238.58 | Fe II p | 5262.10 | Ti II | 5276.03 | Cr I |
| 5239.82 | Sc II | 5262.24 | Ca I | 5276.18 | Co I |
| 5240.47 | Cr I | 5262.48 | Fe II p | 5276.88 | Nd II |
| 5240.88 | V I | 5263.31 | Fe I | 5279.92 | Cr II |
| 5242.49 | Fe I | 5263.48 | Ti I | 5280.08 | Cr II |
| 5243.40 | Cr I | 5263.75 | Cr I | 5280.29 | Cr I |
| 5243.50 | Cr II p | 5263.87 | Fe I | 5280.36 | Fe I |
| 5243.80 | Fe I | 5263.99 | V II | 5280.63 | Co I |
| 5246.75 | Cr II | 5264.15 | Cr I | 5281.69 | Ni I |
| 5247.05 | Fe I | 5264.24 | Ca I | 5281.80 | Fe I |
| 5247.29 | Ti I | 5264.80 | Fe II | 5282.39 | Ti Ⅰ |
| 5247.56 | Cr I | 5265.16 | Cr I | 5283.44 | Ti Ⅰ |
| 5247.92 | Co I | 5265.42 | Fe I p | 5283.63 | Fe Ⅰ |
| 5249.10 | Fe I | 5265.56 | Ca I | 5284.09 | Fe Ⅱ |
| 5249.40 | Cr II | 5265.72 | Cr I | 5284.27 | Fe Ⅰ |
| 5249.59 | Nd II | 5265.97 | Ti I | 5284.38 | Ti Ⅰ |
| 5250.00 | Co I | 5266.12 | V I | 5284.42 | Fe Ⅰ |
| 5250.21 | Fe I | 5266.30 | Co I | 5284.62 | Fe Ⅰ |
| 5250.65 | Fe I | 5266.49 | Ti I p | 5285.12 | Fe Ⅰ |
| 5250.82 | Nd II | 5266.56 | Fe I | 5287.19 | Cr Ⅰ |
| 5251.74 | Pr II | 5267.28 | Fe I p | 5287.57 | Co Ⅰ |
| 5252.04 | Ti II p | 5267.32 | Gd II | 5287.79 | Co Ⅰ |
| 5252.10 | Ti I | 5268.35 | Ni I | 5288.53 | Fe Ⅱ |
| 5253.03 | Fe I p | 5268.50 | Co I | 5289.28 | Ti Ⅱ |
| 5253.48 | Fe I | 5268.62 | Ti II | 5289.82 | Y Ⅱ |
| 5254.65 | Co I | 5269.15 | Fe II | 5290.83 | La Ⅱ |
| 5254.92 | Cr I | 5269.54 | Fe I | 5292.59 | Fe Ⅰ |
| 5254.92 | Fe II p | 5269.93 | Ti I | 5292.63 | Pr Ⅱ |
| 5254.96 | Fe I | 5270.06 | Fe I p | 5292.86 | Mn Ⅰ |
| 5255.13 | Cr I | 5270.27 | Ca I | 5292.87 | Cr Ⅰ |
| 5255.32 | Mn I | 5270.36 | Fe I | 5293.03 | Fe Ⅰ |
| 5255.51 | Nd II | 5272.01 | Cr I | 5293.17 | Nd Ⅱ |
| 5255.68 | Fe I p | 5273.18 | Fe I | 5293.38 | Cr Ⅰ |
| 5256.89 | Fe II p | 5273.38 | Fe I | 5293.97 | Fe Ⅰ |
| 5257.62 | Co I | 5273.43 | Nd II | 5294.56 | Fe Ⅰ |
| 5259.74 | Pr II | 5274.24 | Ce II | 5295.32 | Fe Ⅰ |
| 5259.98 | Ti I | 5274.99 | Cr II | 5295.78 | Ti Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5296.69 | Cr Ⅰ | 5322.81 | V Ⅱ | 5345.81 | Cr Ⅰ |
| 5297.24 | Ti Ⅰ | 5323.96 | Ti Ⅰ | 5346.12 | Cr Ⅱ |
| 5297.36 | Cr Ⅰ | 5324.18 | Fe Ⅰ | 5346.54 | Cr Ⅱ |
| 5297.98 | Cr Ⅰ | 5325.28 | Co Ⅰ | 5346.56 | Fe Ⅰ |
| 5298.27 | Cr Ⅰ | 5325.56 | Fe Ⅰ | 5348.32 | Cr Ⅰ |
| 5298.44 | Cr Ⅰ | 5325.95 | Co Ⅰ | 5349.47 | Ca Ⅰ |
| 5298.79 | Fe Ⅰ | 5326.15 | Fe Ⅰ | 5349.74 | Fe Ⅰ |
| 5300.75 | Cr Ⅰ | 5326.15 | Fe Ⅰ | 5349.75 | V Ⅱ |
| 5301.04 | Co Ⅰ | 5326.25 | Co Ⅰ | 5350.10 | Zr Ⅱ |
| 5301.97 | La Ⅱ | 5328.04 | Fe Ⅰ | 5350.36 | Zr Ⅱ |
| 5302.28 | Nd Ⅱ | 5328.34 | Cr Ⅰ | 5350.37 | V Ⅱ |
| 5302.31 | Fe Ⅰ | 5328.53 | Fe Ⅰ | 5350.38 | Gd Ⅰ |
| 5302.62 | La Ⅱ | 5329.12 | Cr Ⅰ | 5351.07 | Ti Ⅰ |
| 5303.26 | V Ⅱ | 5329.72 | Cr Ⅰ | 5351.85 | Ni Ⅰ |
| 5303.54 | La Ⅱ | 5329.99 | Fe Ⅰ | 5352.05 | Co Ⅰ |
| 5304.11 | Fe Ⅰ | 5330.58 | Ce Ⅱ | 5353.39 | Fe Ⅰ |
| 5304.21 | Cr Ⅰ | 5331.46 | Co Ⅰ | 5353.50 | Co Ⅰ |
| 5305.85 | Cr Ⅱ | 5332.65 | Co Ⅰ | 5353.53 | Ce Ⅱ |
| 5307.28 | Cr Ⅰ | 5332.65 | V Ⅱ | 5355.75 | Sc Ⅰ |
| 5307.36 | Fe Ⅰ | 5332.67 | Fe Ⅰ | 5356.98 | Nd Ⅱ |
| 5308.44 | Cr Ⅱ | 5332.90 | Fe Ⅰ | 5357.20 | Sc Ⅱ |
| 5308.71 | Fe Ⅰ | 5333.30 | Gd Ⅰ | 5359.20 | Co Ⅰ |
| 5310.22 | Co Ⅰ | 5334.82 | Co Ⅰ | 5361.17 | Nd Ⅱ |
| 5310.70 | Cr Ⅱ | 5334.88 | Cr Ⅱ | 5361.47 | Nd Ⅱ |
| 5311.46 | Nd Ⅱ | 5336.81 | Ti Ⅱ | 5361.64 | Fe Ⅰ |
| 5312.88 | Cr Ⅰ | 5337.71 | Fe Ⅱ | 5362.78 | Co Ⅰ |
| 5313.59 | Cr Ⅱ | 5337.79 | Cr Ⅱ | 5362.86 | Fe Ⅱ |
| 5313.76 | Ti Ⅱ | 5338.33 | Ti Ⅰ | 5364.87 | Fe Ⅰ |
| 5315.07 | Fe Ⅰ | 5339.93 | Fe Ⅰ | 5365.40 | Fe Ⅰ |
| 5316.61 | Fe Ⅱ | 5340.44 | Gr Ⅰ | 5366.65 | Ti Ⅰ |
| 5316.78 | Fe Ⅱ | 5340.66 | La Ⅱ | 5367.47 | Fe Ⅰ |
| 5317.53 | Fe Ⅰ | 5340.68 | Ti Ⅰ | 5367.53 | V Ⅱ |
| 5318.34 | Sc Ⅱ | 5341.03 | Fe Ⅰ | 5369.59 | Co Ⅰ |
| 5318.41 | Cr Ⅱ | 5341.04 | Sc Ⅰ | 5369.97 | Fe Ⅰ |
| 5318.78 | Cr Ⅰ | 5341.07 | Mn Ⅰ | 5370.36 | Cr Ⅰ |
| 5319.82 | Nd Ⅱ | 5341.22 | V Ⅱ | 5371.43 | Fe Ⅰ |
| 5320.05 | Fe Ⅰ | 5341.33 | Co Ⅰ | 5371.48 | Cr Ⅰ |
| 5321.11 | Fe Ⅰ | 5341.49 | Ti Ⅰ | 5371.49 | Fe Ⅰ |
| 5322.05 | Fe Ⅰ | 5342.70 | Co Ⅰ | 5371.62 | Gd Ⅱ |
| 5322.78 | Pr Ⅱ | 5343.38 | Co Ⅰ | 5371.94 | Nd Ⅱ |
| 5322.78 | Cr Ⅱ | 5344.76 | Cr Ⅰ | 5373.70 | Fe Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5373.72 | Cr Ⅰ | 5405.00 | Cr Ⅰ | 5435.87 | Ni Ⅰ |
| 5373.72 | Cr Ⅰ | 5405.35 | Fe Ⅰ | 5436.30 | Fe Ⅰ |
| 5376.85 | Fe Ⅰ | 5405.78 | Fe Ⅰ | 5436.59 | Fe Ⅰ |
| 5377.63 | Mn Ⅰ | 5407.42 | Mn Ⅰ | 5436.70 | Ti Ⅰ |
| 5379.58 | Fe Ⅰ | 5407.62 | Cr Ⅱ | 5441.17 | Gd Ⅱ |
| 5380.97 | La Ⅱ | 5408.94 | Ti Ⅰ | 5441.32 | Fe Ⅰ |
| 5381.02 | Ti Ⅰ | 5409.13 | Fe Ⅰ | 5442.27 | Nd Ⅱ |
| 5381.26 | Pr Ⅱ | 5409.22 | Ce Ⅱ | 5442.41 | Cr Ⅰ |
| 5383.37 | Fe Ⅰ | 5409.61 | Ti Ⅰ | 5444.59 | Co Ⅰ |
| 5386.34 | Fe Ⅰ | 5409.79 | Cr Ⅰ | 5445.04 | Fe Ⅰ |
| 5386.98 | Cr Ⅰ | 5410.91 | Fe Ⅰ | 5446.58 | Fe Ⅰ |
| 8387.51 | Fe Ⅰ | 5411.23 | Ni Ⅰ | 5446.59 | Ti Ⅰ |
| 5387.57 | Cr Ⅰ | 5414.09 | Fe Ⅱ | 5446.59 | Ti Ⅰ |
| 5388.35 | Ni Ⅰ | 5415.20 | Fe Ⅰ | 5446.76 | Cr Ⅰ |
| 5389.46 | Fe Ⅰ | 5415.28 | V Ⅰ | 5446.92 | Fe Ⅰ |
| 5390.00 | Ti Ⅰ | 5416.38 | Nd Ⅱ | 5451.12 | Nd Ⅱ |
| 5390.39 | Cr Ⅰ | 5417.03 | Fe Ⅰ | 5152.03 | Ti Ⅱ |
| 5391.35 | Cr Ⅰ | 5418.80 | Ti Ⅱ | 5452.12 | Fe Ⅰ |
| 5391.35 | Cr Ⅰ | 5419.19 | Ti Ⅰ | 5453.26 | Ni Ⅰ |
| 5391.49 | Fe Ⅰ | 5420.36 | Mn Ⅰ | 5453.65 | Ti Ⅰ |
| 5392.37 | Ni Ⅰ | 5420.90 | Cr Ⅱ | 5454.57 | Co Ⅰ |
| 5393.17 | Fe Ⅰ | 5421.18 | Si Ⅰ | 5455.43 | Fe Ⅰ |
| 5393.39 | Ce Ⅱ | 5421.56 | Nd Ⅱ | 5455.61 | Fe Ⅰ |
| 5394.32 | Gd Ⅱ | 5421.85 | Fe Ⅰ | 5455.82 | Nd Ⅱ |
| 5394.67 | Mn Ⅰ | 5422.15 | Fe Ⅰ | 5457.47 | Mn Ⅰ |
| 5394.68 | Fe Ⅰ | 5424.07 | Fe Ⅰ | 5460.50 | Ti Ⅰ |
| 5395.25 | Fe Ⅰ | 5424.15 | Fe Ⅰ | 5461.54 | Fe Ⅰ |
| 5396.30 | Ti Ⅱ | 5424.55 | Ba Ⅰ | 5462.49 | Ni Ⅰ |
| 5396.60 | Ti Ⅰ | 5424.56 | Ni Ⅰ | 5462.97 | Fe Ⅰ |
| 5396.60 | Ti Ⅰ | 5424.65 | Ni Ⅰ | 5463.28 | Fe Ⅰ |
| 5397.09 | Ti Ⅰ | 5425.27 | Fe Ⅱ | 5463.97 | Cr Ⅰ |
| 5397.13 | Fe Ⅰ | 5426.26 | Ti Ⅰ | 5464.29 | Fe Ⅰ |
| 5397.60 | Fe Ⅰ | 5429.14 | Ti Ⅰ | 5466.40 | Fe Ⅰ |
| 5398.28 | Fe Ⅰ | 5429.70 | Fe Ⅰ | 5466.99 | Fe Ⅰ |
| 5599.49 | Mn Ⅰ | 5429.83 | Fe Ⅰ | 5466.99 | Fe Ⅰ |
| 5400.51 | Fe Ⅰ | 5431.53 | Nd Ⅱ | 5468.10 | Ni Ⅰ |
| 5400.61 | Cr Ⅰ | 5432.35 | Cr Ⅰ | 5469.29 | Fe Ⅰ |
| 5402.78 | Y Ⅱ | 5432.55 | Mn Ⅰ | 5469.30 | Co Ⅰ |
| 5403.82 | Fe Ⅰ | 5432.95 | Fn Ⅰ | 5469.72 | Gd Ⅱ |
| 5404.12 | Fe Ⅰ | 5432.98 | Fe Ⅱ | 5470.17 | Fe Ⅰ |
| 5404.14 | Fe Ⅰ | 5434.53 | Fe Ⅰ | 5470.53 | Gd Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5470.64 | Mn Ⅰ | 5494.89 | Ni Ⅰ | 5534.86 | Fe Ⅱ |
| 5472.30 | Ce Ⅱ | 5497.42 | Y Ⅱ | 5535.42 | Fe Ⅰ |
| 5472.63 | Cr Ⅱ | 5497.52 | Fe Ⅰ | 5535.42 | Fe Ⅰ |
| 5472.70 | Ti Ⅰ | 5501.47 | Fe Ⅰ | 5535.48 | Ba Ⅰ |
| 5472.72 | Fe Ⅰ | 5502.05 | Cr Ⅱ | 5536.28 | C² |
| 5473.40 | Y Ⅱ | 5503.18 | Cr Ⅱ | 5536.67 | C² |
| 5473.52 | Ti Ⅰ | 5504.12 | Ni Ⅰ | 5537.76 | Mn Ⅰ |
| 5473.52 | Ti Ⅱ | 5505.87 | Mn Ⅰ | 5538.54 | Fe Ⅰ |
| 5473.91 | Fe Ⅰ | 5505.89 | Fe Ⅰ | 5538.54 | Fe Ⅰ |
| 5476.30 | Fe Ⅰ | 5506.51 | Mo Ⅰ | 5539.28 | Fe Ⅰ |
| 5476.57 | Fe Ⅰ | 5506.78 | Fe Ⅰ | 5540.05 | Sr Ⅰ |
| 5476.69 | Lu Ⅱ | 5508.60 | Cr Ⅱ | 5540.42 | C² |
| 5476.91 | Ni Ⅰ | 5509.91 | Y Ⅱ | 5543.18 | Fe Ⅰ |
| 5477.70 | Ti Ⅰ | 5510.00 | Ni Ⅰ | 5543.93 | Fe Ⅰ |
| 5478.35 | Cr Ⅰ | 5510.68 | Cr Ⅱ | 5544.61 | Y Ⅱ |
| 5478.48 | Fe Ⅰ | 5512.09 | Ce Ⅱ | 5545.01 | Gd Ⅱ |
| 5480.50 | Cr Ⅰ | 5512.28 | Fe Ⅰ | 5545.26 | Fe Ⅱ |
| 5480.75 | Y Ⅱ | 5512.53 | Ti Ⅰ | 5546.02 | Y Ⅱ |
| 5480.87 | Sr Ⅰ | 5512.98 | Co Ⅰ | 5546.51 | Fe Ⅰ |
| 5480.87 | Fe Ⅰ | 5514.35 | Ti Ⅰ | 5547.00 | Fe Ⅰ |
| 5480.89 | Ni Ⅰ | 5514.54 | Ti Ⅰ | 5547.08 | V Ⅰ |
| 5481.25 | Fe Ⅰ | 5514.80 | Ni Ⅰ | 5548.47 | Nd Ⅱ |
| 5481.43 | Ti Ⅰ | 5516.77 | Mn Ⅰ | 5549.94 | Fe Ⅰ |
| 5481.45 | Fe Ⅰ | 5517.08 | Fe Ⅰ | 5551.98 | Mn Ⅰ |
| 5481.86 | Ti Ⅰ | 5518.49 | Ce Ⅱ | 5552.25 | Sc Ⅱ |
| 5483.11 | Fe Ⅰ | 5519.72 | Fe Ⅱ | 5553.59 | Fe Ⅰ |
| 5483.35 | Co Ⅰ | 5521.14 | Fe Ⅰ | 5553.69 | Ni Ⅰ |
| 5485.70 | Nd Ⅱ | 5522.46 | Fe Ⅰ | 5554.90 | Fe Ⅰ |
| 5487.16 | Fe Ⅰ | 5524.25 | Fe Ⅰ | 5557.90 | Fe Ⅰ |
| 5487.75 | Fe Ⅰ | 5525.14 | Fe Ⅱ | 5557.90 | Fe Ⅰ |
| 5488.21 | Ti Ⅰ | 5525.55 | Fe Ⅰ | 5557.95 | Fe Ⅰ |
| 5490.15 | Ti Ⅰ | 5526.81 | Sc Ⅱ | 5557.95 | A1 Ⅰ |
| 5490.65 | Ti Ⅱ | 5528.41 | Mg Ⅰ | 5558.75 | V Ⅰ |
| 5491.84 | Fe Ⅰ | 5529.15 | Fe Ⅰ | 5560.23 | Fe Ⅰ |
| 5492.82 | Ti Ⅱ | 5530.78 | Co Ⅰ | 5562.12 | Fe Ⅰ |
| 5493.45 | La Ⅱ | 5531.95 | Fe Ⅰ | 5562.71 | Fe Ⅰ |
| 5493.51 | Fe Ⅰ | 5532.35 | C² | 5562.71 | Fe Ⅰ |
| 5493.85 | Fe Ⅰ | 5532.75 | Fe Ⅰ | 5563.60 | Fe Ⅰ |
| 5493.85 | Fe Ⅰ | 5533.43 | C² | 5563.69 | Fe Ⅰ |
| 5494.47 | Fe Ⅰ | 5533.56 | C² | 5563.69 | Fe Ⅰ |
| 5494.89 | Ni Ⅰ | 5533.80 | C² | 5565.48 | Ti Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5565.71 | Fe Ⅰ | 5610.36 | Y Ⅱ | 5657.87 | Sc Ⅱ |
| 5567.40 | Fe Ⅰ | 5612.34 | C² | 5658.33 | Sc Ⅱ |
| 5569.63 | Fe | 5614.79 | Ni Ⅰ | 5658.54 | Fe Ⅰ |
| 5572.85 | Fe Ⅰ | 5615.18 | Fe Ⅰ | 5658.83 | Fe Ⅰ |
| 5573.10 | Fe Ⅰ | 5615.31 | Fe Ⅰ | 5660.79 | Fe Ⅰ |
| 5576.10 | Fe Ⅰ | 5615.65 | Fe Ⅰ | 5662.15 | Ti Ⅰ |
| 5577.03 | Fe Ⅰ | 5618.65 | Fe Ⅰ | 5662.53 | Fe Ⅰ |
| 5577.34 | C² | 5619.60 | Fe Ⅰ | 5662.89 | Ti Ⅰ |
| 5578.73 | Ni Ⅰ | 5620.53 | Fe Ⅰ | 5662.95 | Y Ⅱ |
| 5581.97 | Ca Ⅰ | 5620.62 | Nd Ⅱ | 5664.02 | Ni Ⅰ |
| 5584.77 | Fe Ⅰ | 5620.63 | Cr Ⅱ | 5664.04 | Cr Ⅰ |
| 5585.04 | C² | 5621.22 | C² | 5665.60 | Si Ⅰ |
| 5586.76 | Fe Ⅰ | 5624.06 | Fe Ⅰ | 5667.16 | Sc Ⅱ |
| 5587.58 | Fe Ⅰ | 5624.55 | Fe Ⅰ | 5669.03 | Sc Ⅱ |
| 5587.87 | Ni Ⅰ | 5624.61 | V Ⅰ | 5669.95 | Ni Ⅰ |
| 5588.76 | Ca Ⅰ | 5625.33 | Ni Ⅰ | 5670.83 | V Ⅰ |
| 5589.38 | Ni Ⅰ | 5625.68 | Fe Ⅰ | 5671.81 | Sc Ⅰ |
| 5590.12 | Ca Ⅰ | 5627.63 | V Ⅰ | 5675.41 | Ti Ⅰ |
| 5590.37 | C² | 5628.35 | Ni Ⅰ | 5678.6 | Fe Ⅰ p |
| 5592.15 | Ni Ⅰ | 5631.86 | C | 5679.02 | Fe Ⅰ |
| 5592.28 | Ni Ⅰ | 5633.73 | C | 5679.91 | Ti Ⅰ |
| 5592.41 | V Ⅰ | 5635.20 | C | 5682.20 | Ni Ⅰ |
| 5593.73 | Ni Ⅰ | 5637.4 | Fe Ⅰ | 5682.63 | NaⅠ |
| 5594.43 | Nd Ⅱ | 5638.27 | Fe Ⅰ | 5684.19 | Sc Ⅱ |
| 5594.47 | Ca Ⅰ | 5638.82 | Ni Ⅰ | 5686.53 | Fe Ⅰ |
| 5594.66 | Fe Ⅰ | 5640.97 | Sc Ⅱ | 5686.83 | Sc Ⅰ |
| 5596.19 | C² | 5641.46 | Fe Ⅰ | 588.21 | Na Ⅰ |
| 5598.30 | Fe Ⅰ | 5641.88 | Ni Ⅰ | 5688.53 | Nd Ⅱ |
| 5598.47 | Fe Ⅰ | 5643.1 | Ni Ⅰ | 5689.47 | Ti Ⅰ |
| 5598.49 | Ca Ⅰ | 5643.94 | Fe Ⅰ | 5690.47 | Si Ⅰ |
| 5600.04 | Ni Ⅰ | 5644.04 | Fe Ⅰ | 5691.51 | Fe Ⅰ |
| 5600.24 | Fe Ⅰ | 5644.14 | Ti Ⅰ | 5691.52 | Ni Ⅰ |
| 5600.24 | Fe Ⅰ | 5645.66 | Si Ⅰ | 5693.63 | Fe Ⅰ |
| 5601.29 | Ca Ⅰ | 5647.23 | Co Ⅰ | 5694.73 | Cr Ⅰ |
| 5602.79 | Fe Ⅰ | 5648.57 | Ti Ⅰ | 5695.00 | Ni Ⅰ |
| 5602.85 | Ca Ⅰ | 5649.37 | Cr Ⅰ | 5698.33 | Cr Ⅰ |
| 5602.96 | Fe Ⅰ | 5649.70 | Ni Ⅰ | 5698.51 | V Ⅰ |
| 5603.65 | Nd Ⅱ | 5652.01 | Fe Ⅰ | 5700.14 | Sc Ⅰ |
| 5605.90 | C² | 5655.18 | Fe Ⅰ | 5700.24 | S Ⅰ |
| 5607.66 | Fe Ⅰ | 5655.51 | Fe Ⅰ | 5700.24 | Cu Ⅰ |
| 5610.26 | Ce Ⅱ | 5655.51 | Fe Ⅰ | 5702.31 | Cr Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5702.67 | Ti Ⅰ | 5756.45 | Ti Ⅰ | 5805.76 | Fe Ⅰ |
| 5703.56 | V Ⅰ | 5762.29 | Ti Ⅰ | 5805.77 | La Ⅱ |
| 5704.74 | Fe Ⅰ | 5762.43 | Fe Ⅰ | 5806.73 | Fe Ⅰ |
| 5707.48 | Fe Ⅰ | 5762.99 | Fe Ⅰ | 5807.79 | Fe Ⅰ |
| 5705.99 | Fe Ⅰ | 5768.90 | Ce Ⅱ | 5809.25 | Fe Ⅰ |
| 5706.21 | Nd Ⅱ | 5769.06 | La Ⅱ | 5811.93 | Fe Ⅱ |
| 5706.97 | V Ⅰ | 5722.14 | Si Ⅰ | 5814.80 | Fe Ⅰ |
| 5708.11 | Fe Ⅰ | 5772.26 | Si Ⅰ | 5815.23 | Fe Ⅰ |
| 5708.44 | Si Ⅰ | 5772.40 | V Ⅰ | 5816.36 | Fe Ⅰ |
| 5709.38 | Fe Ⅰ | 5774.04 | Ti Ⅰ | 5825.87 | Nd Ⅱ |
| 5709.56 | Ni Ⅰ | 5775.09 | Fe Ⅰ | 5829.12 | Fe Ⅱ |
| 5711.07 | Fe Ⅰ | 5777.77 | Cr Ⅰ | 5831.62 | Ni Ⅰ |
| 5711.75 | Sc Ⅰ | 5778.47 | Fe Ⅰ | 5831.62 | Ni Ⅰ |
| 5711.87 | Fe Ⅰ | 5780.45 | Si Ⅰ | 5835.10 | Fe Ⅰ |
| 5711.91 | Ni Ⅰ | 5780.62 | Fe Ⅰ | 5835.50 | Fe Ⅱ |
| 5712.15 | Fe Ⅰ | 5780.77 | Ni Ⅰ | 5838.42 | Fe Ⅰ |
| 5712.78 | Cr Ⅰ | 5780.78 | Ti Ⅰ | 5839.78 | Ti Ⅰ |
| 5715.09 | Ni Ⅰ | 5781.69 | Y Ⅱ | 5842.39 | Nd Ⅰ |
| 5715.11 | Fe Ⅰ | 5782.14 | Cu Ⅰ | 5846.31 | V Ⅰ |
| 5715.11 | Fe Ⅰ | 5783.11 | Cr Ⅰ | 5847.01 | Ni Ⅰ |
| 5716.45 | Ti Ⅰ | 5783.93 | Cr Ⅰ | 5848.09 | Fe Ⅰ |
| 5717.85 | Fe Ⅰ | 5784.18 | Ba Ⅱ | 5848.09 | Fe Ⅰ |
| 5718.12 | Nd Ⅱ | 5785.08 | Mg Ⅰ | 5852.19 | Fe Ⅰ |
| 5727.02 | V Ⅰ | 5785.28 | Pr Ⅱ | 5853.18 | Fe Ⅰ |
| 5727.16 | V Ⅰ | 5785.64 | Si Ⅱ | 5853.68 | Ba Ⅰ |
| 5729.2 | Cr Ⅰ | 5785.86 | Cr Ⅰ | 5855.13 | Fe Ⅰ |
| 5731.77 | Fe Ⅰ | 5785.98 | Ti Ⅰ | 5856.08 | Fe Ⅰ |
| 5732.29 | Fe Ⅰ | 5787.99 | Cr Ⅰ | 5857.45 | Ca Ⅰ |
| 5732.72 | Fe Ⅱ | 5791.01 | Cr Ⅰ | 5857.76 | N i Ⅰ |
| 5739.98 | Ti Ⅰ | 5791.04 | Fe Ⅰ | 5858.77 | Fe Ⅰ |
| 5741.86 | Fe Ⅰ | 5793.13 | Si Ⅰ | 5859.61 | Fe Ⅰ |
| 5747.95 | Fe Ⅰ | 5793.93 | Fe Ⅰ | 5860.92 | Ti Ⅱ |
| 5748.34 | Ni Ⅰ | 5797.57 | La Ⅱ | 5861.11 | Fe Ⅰ |
| 5749.28 | Ni Ⅰ | 5797.91 | Si Ⅰ | 5862.36 | Fe Ⅰ |
| 5749.41 | Gd Ⅱ | 5798.19 | Fr Ⅰ | 5863.70 | La Ⅱ |
| 5752.04 | Fe Ⅰ | 5798.46 | Cr Ⅰ | 5864.24 | Fe Ⅰ |
| 5753.14 | Fe Ⅰ | 5804.02 | Nd Ⅱ | 5866.45 | Ti Ⅰ |
| 5753.38 | Fe Ⅰ | 5804.06 | Fe Ⅰ | 5867.57 | Ca Ⅰ |
| 5753.69 | Cr Ⅰ | 5804.27 | Ti Ⅰ | 5870.65 | Fe Ⅰ |
| 5754.68 | Ni Ⅰ | 5804.48 | Fe Ⅰ | 5873.21 | Fe Ⅰ |
| 5754.89 | Fe Ⅰ | 5805.23 | Ni Ⅰ | 5875.65 | He Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 5875.99 | He Ⅰ | 5953.16 | Ti Ⅰ | 6016.66 | Fe Ⅰ |
| 5876.27 | Fe Ⅰ | 5956.70 | Fe Ⅰ | 6019.36 | Fe Ⅰ |
| 5876.55 | Cr Ⅰ | 5958.22 | Fe Ⅰ | 6020.17 | Fe Ⅰ |
| 5877.77 | Fe Ⅰ | 5958.23 | Fe Ⅰ | 6021.80 | Mn Ⅰ |
| 5881.28 | Fe Ⅰ | 5958.34 | Fe Ⅰ | 6021.82 | Fe Ⅰ |
| 5883.84 | Fe Ⅰ | 5959.15 | Cr Ⅰ | 6021.82 | Fe Ⅰ |
| 5889.95 | Na Ⅰ | 5965.83 | Ti Ⅰ | 6021.82 | Fe Ⅰ |
| 5892.88 | Ni Ⅰ | 5969.55 | Fe Ⅰ | 6024.07 | Fe Ⅰ |
| 5895.92 | Na Ⅰ | 5971.09 | La Ⅱ | 6025.73 | Ni Ⅰ |
| 5897.54 | V Ⅱ | 5973.37 | Fe Ⅰ | 6026.81 | V Ⅱ |
| 5899.30 | Ti Ⅰ | 5975.35 | Fe Ⅰ | 6027.06 | Fe Ⅰ |
| 5902.18 | Cr Ⅰ | 5975.36 | Fe Ⅰ | 6031.07 | V Ⅱ |
| 5902.52 | Fe Ⅰ | 5975.83 | Ce Ⅱ | 6031.27 | Nd Ⅱ |
| 5903.32 | Ti Ⅰ | 5976.80 | Fe Ⅰ | 6034.20 | Ce Ⅱ |
| 5904.07 | Gd Ⅱ | 5978.54 | Ti Ⅰ | 6039.69 | V Ⅰ |
| 5905.67 | Fe Ⅰ | 5978.90 | Fe Ⅲ | 6041.93 | S Ⅰ |
| 5908.24 | Fe Ⅰ | 5982.84 | Cr Ⅰ | 6042.09 | Fe Ⅰ |
| 5909.99 | Fe Ⅰ | 5983.70 | Fe Ⅰ | 6043.39 | Ce Ⅱ |
| 5914.16 | Fe Ⅰ | 5984.09 | Co Ⅰ | 6045.85 | Zr Ⅰ |
| 5914.16 | Fe Ⅰ | 5984.81 | Fe Ⅰ | 6046.04 | S Ⅰ |
| 5915.16 | Dy Ⅱ | 5987.06 | Fe Ⅰ | 6052.66 | S Ⅰ |
| 5916.25 | Fe Ⅰ | 5988.56 | Ti Ⅰ | 6053.48 | Cr Ⅱ |
| 5918.55 | Ti Ⅰ | 5991.38 | Fe Ⅱ | 6053.68 | Ni Ⅰ |
| 5922.11 | Ti Ⅰ | 5991.89 | Co Ⅰ | 6055.99 | Fe Ⅰ |
| 5927.80 | Fe Ⅰ | 5996.01 | Ti Ⅰ | 6062.75 | Cr Ⅰ |
| 5928.50 | Fe Ⅰ | 5996.49 | Fe Ⅰ | 6062.88 | Zr Ⅰ |
| 5928.86 | V Ⅱ | 5996.74 | Ni Ⅰ | 6062.89 | Fe Ⅰ |
| 5929.70 | Fe Ⅰ | 5997.61 | Ni Ⅰ | 6064.63 | Ti Ⅰ |
| 5930.17 | Fe Ⅰ | 5997.81 | Fe Ⅰ | 6065.49 | Fe Ⅰ |
| 5933.80 | Fe Ⅰ | 5999.30 | FeⅢ | 6077.37 | V Ⅰ |
| 5934.66 | Fe Ⅰ | 6000.67 | Co Ⅰ | 6078.50 | Fe Ⅰ |
| 5935.39 | Co Ⅰ | 6003.03 | Fe Ⅰ | 6079.02 | Fe Ⅰ |
| 5941.76 | Ti Ⅰ | 6005.53 | Fe Ⅰ | 6081.42 | V Ⅰ |
| 5943.11 | Fe Ⅰ | 6005.53 | Fe Ⅰ | 6082.43 | Co Ⅰ |
| 5943.58 | Fe Ⅰ | 6007.31 | Ni Ⅰ | 6082.72 | Fe Ⅰ |
| 5943.62 | Fe Ⅰ | 6007.96 | Fe Ⅰ | 6083.82 | V Ⅱ |
| 5947.50 | Fe Ⅰ | 6008.58 | Fe Ⅰ | 6084.11 | Fe Ⅱ |
| 5948.58 | Si Ⅰ | 6012.21 | Fe Ⅰ | 6085.23 | Ti Ⅰ |
| 5949.35 | Fe Ⅰ | 6012.25 | Ni Ⅰ | 6085.27 | Fe Ⅰ |
| 5949.35 | Fe Ⅰ | 6013.50 | Mn Ⅰ | 6086.29 | Ni Ⅰ |
| 5952.75 | Fe Ⅰ | 6016.64 | Mn Ⅰ | 6089.47 | V Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 6089.57 | Fe Ⅰ | 6122.22 | Ca Ⅰ | 6160.75 | Fe Ⅱ |
| 6090.18 | V Ⅰ | 6122.44 | Mn Ⅱ | 6161.19 | Pr Ⅱ |
| 6091.18 | Ti Ⅰ | 6122.64 | Co Ⅰ | 6161.29 | Ca Ⅰ |
| 6091.74 | Fe Ⅰ | 6125.03 | St Ⅰ | 6162.17 | Ca Ⅰ |
| 6091.92 | Si Ⅰ | 6126.09 | La Ⅱ | 6163.42 | Ni Ⅰ |
| 6092.81 | Ti Ⅰ | 6126.22 | Ti Ⅰ | 6163.56 | Fe Ⅰ |
| 6093.14 | Co Ⅰ | 6127.91 | Fe Ⅰ | 6163.76 | Ca Ⅰ |
| 6093.66 | Fe Ⅰ | 6127.91 | Fe Ⅰ | 6165.37 | Fe Ⅰ |
| 6094.42 | Fe Ⅰ | 6128.99 | Ni Ⅰ | 6166.44 | Ca Ⅰ |
| 6096.69 | Fe Ⅰ | 6129.23 | Cr Ⅱ | 6169.06 | Ca Ⅰ |
| 6097.08 | Fe Ⅰ | 6129.57 | La Ⅱ | 6169.56 | Ca Ⅰ |
| 6097.29 | Ca Ⅰ | 6129.71 | Fe Ⅱ | 6170.49 | Fe Ⅰ |
| 6098.28 | Fe Ⅰ | 6130.17 | Ni Ⅰ | 6170.57 | Ni Ⅰ |
| 6098.66 | Ti Ⅰ | 6131.54 | Si Ⅰ | 6170.57 | Ni Ⅰ |
| 6100.23 | Fe Ⅰ | 6131.86 | Si Ⅰ | 6173.34 | Fe Ⅰ |
| 6100.29 | Fe Ⅰ | 6131.92 | Mn Ⅰ | 6174.74 | Ti Ⅰ |
| 6100.37 | La Ⅱ | 6133.95 | Ni Ⅰ | 6175.42 | Ni Ⅰ |
| 6102.18 | Fe Ⅰ | 6135.36 | V Ⅰ | 6176.81 | Ni Ⅰ |
| 6102.72 | Ca Ⅰ | 6135.76 | Cr Ⅰ | 6177.26 | Ni Ⅰ |
| 6103.19 | Fe Ⅰ | 6136.62 | Fe Ⅰ | 6178.13 | Fe Ⅱ |
| 6105.15 | Fe Ⅰ | 6137.00 | Fe Ⅰ | 6179.38 | Fe Ⅱ |
| 6105.38 | Mn Ⅱ | 6137.70 | Fe Ⅰ | 6180.09 | Ni Ⅰ |
| 6106.47 | Zr Ⅱ | 6141.72 | Ba Ⅱ | 6180.09 | NiⅠ |
| 6106.47 | Zr Ⅱ | 6141.73 | Fe Ⅰ | 6180.22 | Fe Ⅰ |
| 6106.84 | Fe Ⅰ | 6142.53 | Si Ⅰ | 6183.12 | **Ni** Ⅰ |
| 6107.32 | Fe Ⅰ | 6145.08 | Si Ⅰ | 6183.89 | Ni Ⅰ |
| 6108.12 | Ni Ⅰ | 6146.22 | Ti Ⅰ | 6183.91 | Nd Ⅱ |
| 6108.80 | Mn Ⅱ | 6147.15 | Cr Ⅱ | 6186.14 | Ti Ⅰ |
| 6110.78 | Ba Ⅰ | 6147.74 | Fe Ⅱ | 6186.74 | Ni Ⅰ |
| 6111.06 | Ni Ⅰ | 6147.85 | Fe Ⅰ | 6187.41 | Fe Ⅰ |
| 6111.62 | V Ⅰ | 6149.24 | Fe Ⅱ | 6188.04 | Fe Ⅰ |
| 6113.33 | Fe Ⅱ | 6150.13 | V Ⅰ | 6188.09 | La Ⅱ |
| 6114.78 | Zr Ⅱ | 6151.62 | Fe Ⅰ | 6189.01 | Co Ⅰ |
| 6116.18 | Ni Ⅰ | 6154.23 | Na Ⅰ | 6191.19 | Ni Ⅰ |
| 6116.18 | Ni Ⅰ | 6155.22 | Si Ⅰ | 6191.56 | Fe Ⅰ |
| 6116.99 | Co Ⅰ | 6155.24 | Fe Ⅱ | 6191.73 | Y Ⅰ |
| 6118.06 | Ni Ⅰ | 6156.10 | Ca Ⅰ | 6193.67 | Sc Ⅰ |
| 6119.51 | V Ⅰ | 6156.25 | Hf Ⅱ | 6199.20 | V Ⅰ |
| 6119.78 | Ni Ⅰ | 6157.73 | Fe Ⅰ | 6199.48 | Fe Ⅰ |
| 6120.25 | Fe Ⅰ | 6159.41 | Fe Ⅰ | 6200.32 | Fe Ⅰ |
| 6121.01 | Ti Ⅰ | 6160.75 | Na Ⅰ | 6204.64 | Ni Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 6210.68 | Sc Ⅰ | 6245.63 | Se Ⅱ | 6295.25 | Ti Ⅰ |
| 6212.04 | Fe Ⅰ | 6246.33 | Fe Ⅰ | 6296.08 | La Ⅱ |
| 6212.30 | Ti Ⅱ | 6247.56 | Fe Ⅱ | 6296.52 | V Ⅰ |
| 6213.44 | Fe Ⅰ | 6248.92 | Fe Ⅱ | 6296.65 | Ti Ⅰ |
| 6215.15 | Fe Ⅰ | 6249.65 | Fe Ⅰ | 6297.80 | Fe Ⅰ |
| 6215.21 | Ti Ⅰ | 6251.83 | V Ⅰ | 6298.08 | Ti Ⅰ |
| 6216.37 | V Ⅰ | 6252.56 | Fe Ⅰ | 6299.66 | Zr Ⅰ |
| 6219.29 | Fe Ⅰ | 6253.82 | Fe Ⅰ | 6300.36 | Ni Ⅰ |
| 6220.46 | Ti Ⅰ | 6254.25 | Si Ⅰ | 6300.70 | Sc Ⅱ |
| 6220.78 | Fe Ⅰ | 6254.26 | Fe Ⅰ | 6301.52 | Fe Ⅰ |
| 6221.40 | Fe Ⅰ | 6255.95 | Fe Ⅰ | 6302.51 | Fe Ⅰ |
| 6221.41 | Ti Ⅰ | 6256.36 | Ni Ⅰ | 6303.46 | Fe Ⅰ |
| 6221.66 | Fe Ⅰ | 6256.37 | Fe Ⅰ | 6305.32 | Fe Ⅱ |
| 6221.88 | Lu Ⅱ | 6256.91 | V Ⅰ | 6305.67 | Sc Ⅰ |
| 6223.99 | Ni Ⅰ | 6257.58 | Co Ⅰ | 6306.05 | Sc Ⅰ |
| 6224.51 | V Ⅰ | 6258.10 | Ti Ⅰ | 6307.85 | Fe Ⅰ |
| 6226.29 | V Ⅱ | 6258.59 | Ni Ⅰ | 6309.90 | Sc Ⅱ |
| 6226.77 | Fe Ⅰ | 6258.60 | V Ⅰ | 6311.51 | Fe Ⅰ |
| 6229.23 | Fe Ⅰ | 6258.71 | Ti Ⅰ | 6312.24 | Ti Ⅰ |
| 6229.34 | Fe Ⅱ | 6258.96 | Sc Ⅰ | 6313.05 | Zr Ⅰ |
| 6230.12 | Ni Ⅰ | 6259.62 | Ni Ⅰ | 6314.67 | Ni Ⅰ |
| 6230.73 | Fe Ⅰ | 6261.10 | Ti Ⅰ | 6314.67 | Ni Ⅰ |
| 6230.74 | V Ⅰ | 6262.30 | La Ⅱ | 6315.32 | Fe Ⅰ |
| 6230.84 | Hf Ⅱ | 6265.14 | Fe Ⅰ | 6315.79 | La Ⅱ |
| 6232.66 | Fe Ⅰ | 6266.32 | V Ⅰ | 6315.81 | Fe Ⅰ |
| 6233.19 | V Ⅰ | 6268.50 | Ti Ⅰ | 6316.61 | Ni Ⅰ |
| 6233.52 | Fe Ⅱ | 6268.84 | V Ⅰ | 6318.02 | Fe Ⅰ |
| 6237.34 | Si Ⅰ | 6270.24 | Fe Ⅰ | 6318.03 | Ti Ⅰ |
| 6238.38 | Fa Ⅱ | 6271.29 | Fe Ⅰ | 6318.11 | Ca Ⅰ |
| 6239.36 | Fe Ⅱ | 6272.05 | Ce Ⅱ | 6318.23 | Mg Ⅰ |
| 6239.41 | Sc Ⅰ | 6272.65 | Ni Ⅰ | 6318.61 | Ca Ⅰ |
| 6239.77 | Cr Ⅱ | 6273.03 | Co Ⅰ | 6318.75 | Mg Ⅰ |
| 6239.78 | Sc Ⅰ | 6274.67 | V Ⅰ | 6319.24 | Mg Ⅰ |
| 6239.95 | Fe Ⅱ | 6279.76 | Se Ⅱ | 6320.39 | La Ⅱ |
| 6240.27 | Fe Ⅰ | 6280.63 | Fe Ⅰ | 6320.85 | Sc Ⅱ |
| 6240.66 | Fe Ⅰ | 6282.64 | Co Ⅰ | 6322.17 | Ni Ⅰ |
| 6242.80 | V Ⅰ | 6285.18 | V Ⅰ | 6322.69 | Fe Ⅰ |
| 6243.11 | V Ⅰ | 6290.97 | Fe Ⅰ | 6327.60 | Ni Ⅰ |
| 6243.86 | Si Ⅰ | 6292.86 | V Ⅰ | 6330.10 | Cr Ⅰ |
| 6244.51 | Sc Ⅰ | 6293.92 | Fe Ⅰ | 6330.86 | Fe Ⅰ |
| 6244.56 | Si Ⅰ | 6295.25 | Ti Ⅰ | 6331.97 | Fe Ⅱ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 6335.34 | Fe Ⅰ | 6395.16 | Co Ⅰ | 6456.38 | Fe Ⅱ |
| 6336.10 | Ti Ⅰ | 6397.97 | CN | 6462.57 | Ca Ⅰ |
| 6336.84 | Fe Ⅰ | 6400.01 | Fe Ⅰ | 6462.72 | Fe Ⅰ |
| 6338.90 | Fe Ⅰ | 6400.34 | Fe Ⅰ | 6462.73 | Fe Ⅰ |
| 6339.15 | Ni Ⅰ | 6405.45 | CN | 6463.11 | Lu Ⅱ |
| 6341.68 | Ba Ⅰ | 6407.30 | Fe Ⅱ | 6464.18 | CN |
| 6343.96 | Ce Ⅱ | 6408.03 | Fe Ⅰ | 6464.67 | Fe Ⅰ |
| 6344.15 | Fe Ⅰ | 6408.38 | CN | 6465.78 | CN |
| 6347.09 | Si Ⅱ | 6408.46 | Sr Ⅰ | 6466.97 | V Ⅰ |
| 6347.84 | Co Ⅰ | 6411.10 | Fe Ⅰ | 6469.21 | Fe Ⅰ |
| 6349.48 | V Ⅰ | 6411.66 | Fe Ⅰ | 6471.66 | Ca Ⅰ |
| 6349.75 | Mn Ⅰ | 6411.39 | Zr Ⅱ | 6475.63 | Fe Ⅰ |
| 6350.49 | Ni Ⅰ | 6411.60 | Ni Ⅰ | 6477.86 | Ca Ⅰ |
| 6353.84 | Fe Ⅰ | 6414.97 | Si Ⅰ | 6478.65 | CN |
| 6355.04 | Fe Ⅰ | 6415.42 | CN | 6481.88 | Fe Ⅰ |
| 6358.12 | La Ⅱ | 6415.50 | S Ⅰ | 6482.21 | Fe Ⅱ |
| 6358.69 | Fe Ⅰ | 6416.91 | Fe Ⅱ | 6482.81 | Ni Ⅰ |
| 6360.80 | Ni Ⅰ | 6417.82 | Co Ⅰ | 6491.61 | Ti Ⅱ |
| 6362.35 | Zn Ⅰ | 6419.65 | Fe Ⅰ | 6491.71 | Mn Ⅰ |
| 6362.87 | Cr Ⅰ | 6419.98 | Fe Ⅰ | 6493.78 | Ca Ⅰ |
| 6362.89 | Fe Ⅰ | 6421.36 | Fe Ⅰ | 6494.99 | Fe Ⅰ |
| 6363.79 | Co Ⅰ | 6421.51 | Ni Ⅰ | 6495.78 | Fe Ⅰ |
| 6364.38 | Fe Ⅰ | 6424.91 | Ni Ⅰ | 6496.46 | Fe Ⅰ |
| 6364.60 | Ni Ⅰ | 6425.54 | CN | 6496.90 | Ba Ⅱ |
| 6366.35 | Ti Ⅰ | 6426.28 | CN | 6497.69 | Ti Ⅰ |
| 6366.48 | Ni Ⅰ | 6428.17 | Ca Ⅰ | 6498.95 | Fe Ⅰ |
| 6369.45 | Fe Ⅱ | 6428.65 | Nd Ⅱ | 6499.65 | Ca Ⅰ |
| 6370.38 | Ni Ⅰ | 6429.91 | Co Ⅰ | 6516.05 | Fe Ⅱ |
| 6371.36 | Si Ⅱ | 6430.85 | Fe Ⅰ | 6518.38 | Fe Ⅰ |
| 6378.26 | Ni Ⅰ | 6431.62 | V Ⅰ | 6518.74 | Si Ⅰ |
| 6380.75 | Fe Ⅰ | 6432.65 | Fe Ⅱ | 6526.65 | Si Ⅰ |
| 6382.07 | Nd Ⅱ | 6435.02 | Y Ⅰ | 6526.99 | La Ⅱ |
| 6383.75 | Fe Ⅱ | 6436.43 | Fe Ⅰ | 6527.20 | Si Ⅰ |
| 6384.67 | Mn Ⅰ | 6437.64 | Eu Ⅱ | 6531.44 | V Ⅰ |
| 6384.70 | Ni Ⅰ | 6438.04 | CN | 6532.89 | Ni Ⅰ |
| 6385.20 | Nd Ⅱ | 6439.07 | Ca Ⅰ | 6533.97 | Fe Ⅰ |
| 6385.74 | Fe Ⅰ | 6440.97 | Mn Ⅰ | 6543.51 | V Ⅰ |
| 6388.41 | Fe Ⅰ | 6449.81 | Ca Ⅰ | 6546.25 | Fe Ⅰ |
| 6390.48 | La Ⅱ | 6450.23 | Co Ⅰ | 6546.28 | Ti Ⅰ |
| 6392.53 | Fe Ⅰ | 6455.00 | Co Ⅰ | 6550.24 | Sr Ⅰ |
| 6393.61 | Fe Ⅰ | 6455.60 | Ca Ⅰ | 6551.68 | Fe Ⅰ |
| 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 | 波长  λ（Å） | 元素  电离度 |
| 6554.23 | Ti Ⅰ |  |  |  |  |
| 6556.07 | Ti Ⅰ |  |  |  |  |
| 6556.79 | Fe Ⅰ |  |  |  |  |
| 6559.58 | Ti Ⅰ |  |  |  |  |
| 6562.82 | H3 |  |  |  |  |
| 6569.23 | Fe Ⅰ |  |  |  |  |
| 6571.22 | Fe Ⅰ |  |  |  |  |
| 6572.78 | Ca Ⅰ |  |  |  |  |
| 6574.24 | Fe Ⅰ |  |  |  |  |
| 6575.02 | Fe Ⅰ |  |  |  |  |
| 6581.22 | Fe Ⅰ |  |  |  |  |
| 6586.33 | Ni Ⅰ |  |  |  |  |
| 6592.92 | Fe Ⅰ |  |  |  |  |
| 6593.88 | Fe Ⅰ |  |  |  |  |
| 6604.60 | Sc Ⅱ |  |  |  |  |
| 6607.02 | Ti Ⅱ |  |  |  |  |
| 660803 | Fe Ⅰ |  |  |  |  |
| 6609.12 | Fe Ⅰ |  |  |  |  |
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