

C,N,O ABUNDANCES IN THE ATMOSPHERES OF FOUR LATE GIANT STARS

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ABSTRACT. The abundance of C,N,O have been determined for 4 late giant stars from atomic and molecular spectra by the method of synthetic spectrum.

Key words: Stars: Atmospheres, late-type giants, chemical composition

The important task in the astrophysics is the light elements abundance analysis for the stellar atmospheres, especially for the late-type giant atmospheres undergone the first "dredge-up". In this work we have determined C,N,O abundance in atmospheres of four late-type giants.

Usually the abundance of oxygen is determined using the profiles of [OI] lines in the red spectral region. Frequently the carbon and on the most nitrogen atomic lines can not be used for abundance analyses because they are not observed in the late-type stars spectra. Among molecules containing carbon and nitrogen the hydrides NH and CH are preferable because they give a possibility to determine the ratio N/H and C/H directly. If the abundance of CH molecule depend on the ratio O/C in the late-type atmospheres, the abundance of NH molecule does not depend on this ratio.

The spectrograms of four K-giants (see Table I, page 150) in blue and red regions with dispersion 4 and 6 Å/mm were obtained on 2.6 m telescope (Crimea). The ultraviolet spectrograms of three stars (except γ 2 Leo) with dispersion 14 Å/mm were obtained on 6m telescope (Northern Caucasus).

We estimated the nitrogen abundance from the NH bands in the region 3350 - 3370 Å for three K-giants - β Gem (K0III), γ 1 Leo (K0III), α Ser (K2III) - using spectrograms with dispersion 14 Å/mm. In synthetic spectra calculations the line absorption coefficient included atomic lines and molecular lines of NH and OH.

We also estimated nitrogen abundance for 3 K-giants - β Gem, γ 1 Leo, γ 2 Leo - using CN-blue (\approx 4200 Å) molecular band 0-0. (Earlier we have determined the ratio O/C for this stars from CI and [OI] lines). In the spectra of α Ser CN-band is too strong to be analyzed.

The carbon abundance was also estimated from CH band (\approx 3889 Å) with previously determined oxygen abundance. We note that this band is very sensitive to carbon abundance for our stars.

Table 1 represents the abundance of C,N,O determined for 4 late giant stars by the method of synthetic spectra from atomic and molecular spectra. The models of atmospheres γ 1 Leo, γ 2 Leo and β Gem were taken from Bell et al. (1976). The model atmosphere for α Ser was calculated using the program SAM1C (see Kipper & Sitska 1981).

References

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