CHEMICAL COMPOSITION OF GALACTIC DISK STARS

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ABSTRACT. Abundances of Na, Al, Ca, in the stars of galactic disks are obtained. The separation of thin and stars on cinematic criterion was made early. The behavior of chemical element abundances with metallicity for studied stars was presented.

Key words: Stars: fundamental parameters; stars: abundances

1. Introduction

The trend of the elemental abundance [El/Fe] with metallicity [Fe/H] in the galactic disk is clue to understand the evolution of the disk and the Galaxy. The different trend (slope) of [El/Fe] vs. [Fe/H] in the thin and thick disks of the Galaxy evidences about different temps and origins of enrichment of the thin and thick disks, i.e. about different chemical and dynamical evolution of two galactic substructures.In this work we show the determination of Na, Al, and Ca abundances in 55 stars belonging to thin and thick disks. Two subsamples have been determined early on the basis of kinematics Mishenina et al. (2004).

2. Observations and parameters

The spectra of studied stars were obtained on 1.93 m telescope of the Observatoire Haute Provence (France) equiped with echelle-spectrograph ELODIE. A resolving power is 42000, the wavelength range is 3850-6800 ÅÅ. Spectrum extraction, wavelength calibration and radial velocity measurement have been performed at the telescope with the on-line data reduction software while straightening of the orders, removing of cosmic ray hits, bad pixels and telluric lines were performed as described in Kats et al. (1998). The continuum level drawing and equivalent width measurements were carried out by us using DECH20 code Galazutdinov, (1992). Equivalent widths of lines were measured by Gaussian function fitting.The

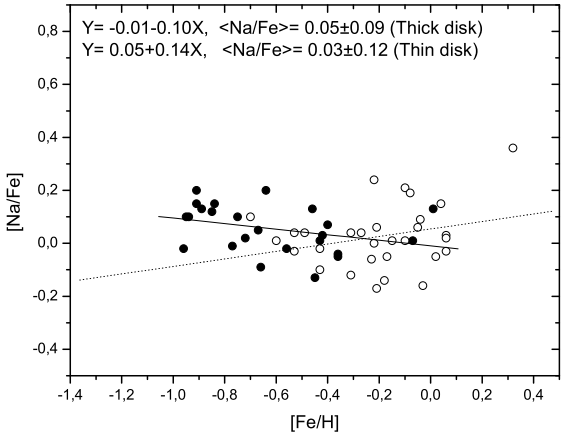

Figure 1: The run of [Na/Fe] with [Fe/H]. Thick disk stars are marked as filled circles, and thin disk stars as open circles.

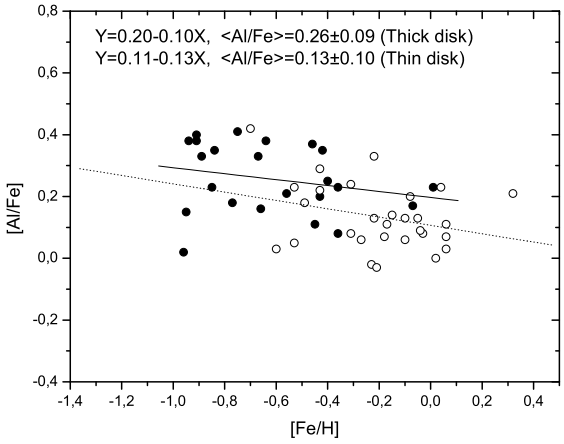

Figure 2: The run of [Al/Fe] with [Fe/H].The notation is the same as in Fig.1.

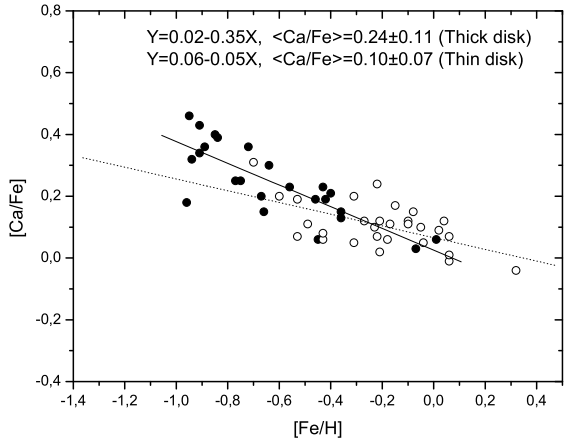

Figure 3: The run of [Ca/Fe] with [Fe/H].The notation is the same as in Fig.1.

temperatures were determined with the very high level of accuracy using the line depth ratios method. The surface gravity log g was determined using the iron ionization equilibrium assumption, where the average iron abundance determined from FeI lines and Fe II lines must be identical. Microturbulent velocities Vt were determined by forcing the abundances determined from individual FeI lines to be independent of equivalent width. The parameters are presented in Mishenina et al. (2004).

3. Elemental abundances

Using the derived stellar parameters and the atmosphere models of Kurucz (1993) we determined the elemental abundances Na, Al, and Ca from an LTE analysis of equivalent widths using the WIDTH9 code. Oscillator strengths for lines have been taken from Kovtyukh & Andrievsky (1999).

4. Results and conclusions

The dependences of [El/Fe] vs. [Fe/H] were presented on figures 1-3. Thick disk stars are marked as filled circles, and thin disk stars as open circles. Linear least-squares fits to both samples, the equations and mean values of Na, Al and Ca abundances are given in the same place. In thick disk stars the mean values of Al and Ca abundances are higher than those in thin disk stars. The thin and thick disk stars clearly show similar abundance trends for Al and Ca. The small inclination is observed for these elements. The inclination for Ca is typical for the αl - elements and it is according with results on the magnesium obtained by Mishenina et al. (2004). For Na we observed the reverse inclination.

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