THE POSSIBILITY OF ORDINARY CHONDRITES SYSTEMATICS USING MÖSSBAUER SPECTROSCOPY.

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Introduction: The presence of iron in various meteorites permits application of Mössbauer spectroscopy for the study of iron-bearing phases. In case of ordinary chondrites this application could be used for the help of systematization of H, L and LL groups as it was shown in [1–3]. In this work we consider new results of the better quality fits of the Mössbauer spectra of H, L and LL ordinary chondrites which can be useful for their systematics.

Results and discussion: Ordinary chondrites from H, L and LL groups (4 H-meteorites, 6 L-meteorites, and 3 LL-meteorites including 6 different samples of Chelyabinsk LL5) were studied using Mössbauer spectroscopy with a high velocity resolution. Mössbauer parameters of spectral components were obtained using a new fit described in [4] which improved the fitting quality. The relative areas of spectral components are related to the Fe content in corresponding phases. Therefore, using relative areas of spectral components associated with olivine (M1+M2) and pyroxene (M1+M2), olivine (M1) and olivine (M2) it was possible to distinguish H and L+LL ordinary chondrites (Fig. 1). However, using relative areas of spectral components related to metallic iron+iron oxides and olivine (M1+M2) it was possible to distinguish H, L and LL ordinary chondrites except one fragment of Chelyabinsk LL5 with higher metallic iron content (Fig. 1). These results demonstrate the possibility of some Mössbauer parameters to be useful for distinguishing H, L and LL ordinary chondrites and, therefore, for their systematization.

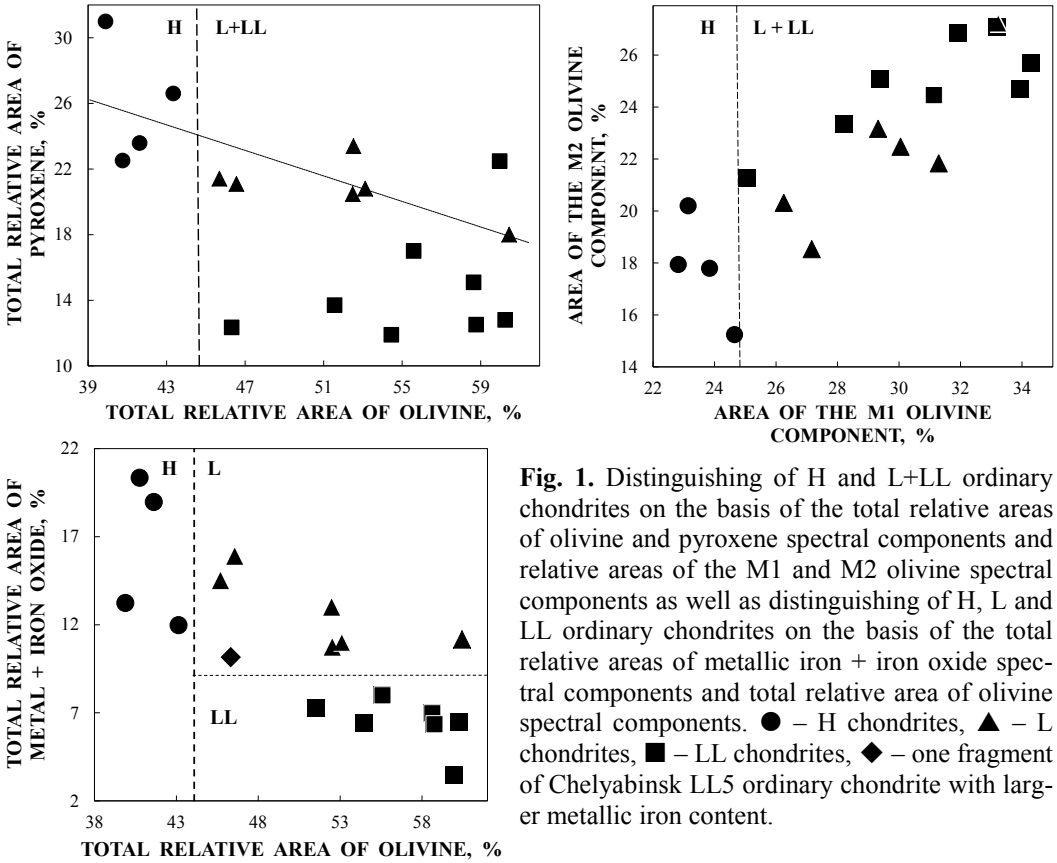

Fig. 1. Distinguishing of H and L+LL ordinary chondrites on the basis of the total relative areas of olivine and pyroxene spectral components and relative areas of the M1 and M2 olivine spectral components as well as distinguishing of H, L and LL ordinary chondrites on the basis of the total relative areas of metallic iron + iron oxide spectral components and total relative area of olivine spectral components. ● – H chondrites, ▲ – L chondrites, ■ – LL chondrites, ◆ – one fragment of Chelyabinsk LL5 ordinary chondrite with larger metallic iron content.

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