A COMPARATIVE STUDY OF ELEMENTAL ABUNDANCES IN MAGNETIC FRACTIONS FROM ABEE EH4, ADHI KOT EH4 AND ATLANTA EL6, PILLISFER EL6 ENSTATITE CHONDRITES. Lavrentjeva Z.A., Lyul A.Yu. V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry RAS, Moscow, lavza@mail.ru

Introduction: The enstatite chondrites (EC) are highly reduced meteorites, characterized by abundant Fe-Ni metal, nearly Fe-free silicates, and unusual sulfides [1]. This has led scientists to believe that they might have formed from an accretionary feeding zone located relatively close to the sun. The EC have also been linked with the origin of the earth because of their similarity in oxygen isotope compositions [2]. EC are divided into two main groups, EH and EL, based on high and low abundances of Fe,Ni metal: both groups show a metamorphic sequence from type 3 to 6 similar to that observed in ordinary chondrites [3,4]. Texturally the EL chondrites appear to have experienced much higher levels of metamorphic alteration then HL chondrites of similar equilibration temperatures. Recent studies of metal in EL3 chondrites reveal the ubiquitous role of impact melting in even the most primitive EL chondrites [5]. Many EL6 (and some EL3 and EL4) have been shocked and partly melted [6]. To receive more information about features of metal composition of EC, the siderophile element contents in magnetic grain – size fractions from Abee EH4, Adhi Kot EH4, Atlanta EL6 and Pillistfer EL6 was determined by INAA. The element abundances normalized to CI values are given in Fig 1(a, b, c, d, e, f).

Results and discussion: Under consideration are peculiarities of elemental composition of magnetic grain-sized fractions extracted from EH and EL groups enstatite chondrites. A distribution siderophile elements in magnetic fractions of two group of enstatite chondrites corresponds to different trends.The fractions from Adhi Kot EH4 chondrite are enriched in Ni; Co; Au и Ir comparing to their contents in Abee EH4 (Fig. 1 a, e. c). Attention is drawn to the much higher contents gold in the grain-sized fractions of Adhi Kot chondrite in comparison with their content in these fractions of Abee. Depletion in Au of magnetic fractions from Abee chondrite is probably due to processes of heating and brecciation by impact. Abee is a breccia consisting of equal proportions of clasts and matrix, kamasite nodules, and sulfides. Due to its brecciated nature, major differences in mineral abundances exist in different areas of the meteorite (total silicates – 30 to 65 wt %, total metal 20 to 40 wt %. [7]. The features result from Abee`s complex history of shock melting and crystallization. Fine-grained fractions differ in concentration of siderophile elements and in characteristics of Ni/Co, Ni/Au, Ni/Ir ratios in equilibration EL chondrites, and considerable differences in these ratios in unequilibrated EH chondrites. Distinction in the fractionation trends of siderophile elements can be associated by their redistribution between different phases of meteorites during metamorphism. The analysis of obtained data gives ground to assume that the meteorite Adhi Kot was formed a relatively little altered matter of the protoplanet nebula. The abundance data for magnetic grain-sized fractions from EH and EL groups showed that refractory element Ir were depleted (Fig. 1 a, b, c, d, e, f). The depletion Ir et al. compatible refractory elements in kamacite indicates a role for liquid –solid metal fractionation of planetary processes, consistent with impact melting [8]. On the example of data of siderophile element content in magnetic fractions the authors come to new ideas about the siderophile element distribution in meteoritic metal. From observed differences of compositions of magnetic fractions it follows that our trace element data accord with this idea that this imply coaccretion of nebular chondritic components concurrently with hypervelocity impact ejecta, or alternatively, that ejecta was combined with more primitive material during regolth processes [12].

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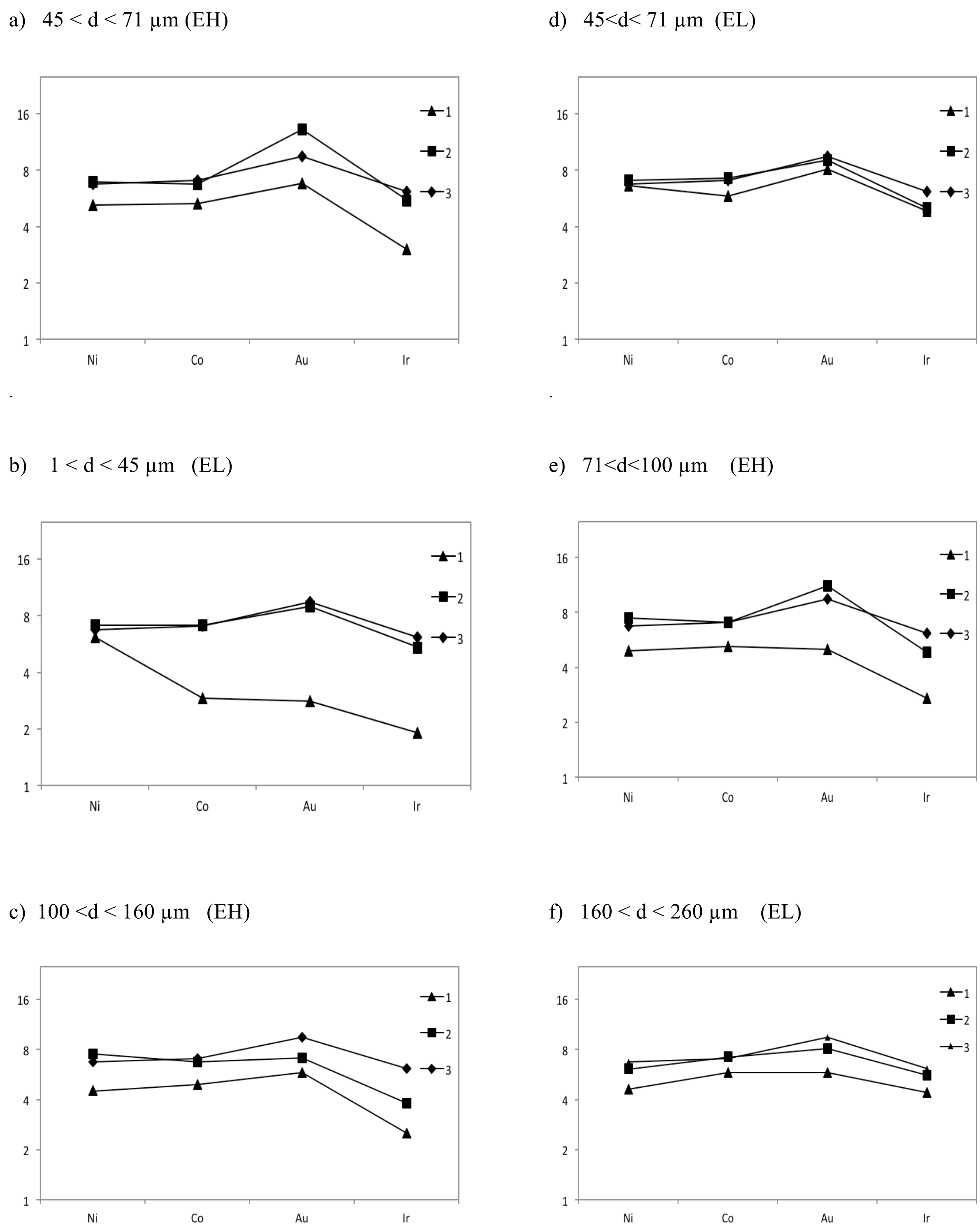

Fig.1. CI chondrite–normalized of siderophile element abundance patterns of magnetic grain-sized fractions from EH group (a,e,c) (1 – Abee, 2 – Adhi Kot) and EL group (b, d, f) (1 – Atlanta , 2 – Pillistfer); 3 – average elemental composition metal in E chondrites [8,9,10]