TRACE ELEMENT CONTENTS OF SILICATE INCLUSIONS IN THE ELGA (IIE) IRON.

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Introduction. Silicate inclusions (SIs) in IIE irons vary in composition from chondritic SIs in Netschaevo to highly fractionated silica-, alkali-rich SIs which are similar to those in the Elga meteorite. It was suggested that these SIs were formed by mixing of metal and silicate components on a parent body or in the solar nebula gas [1-5]. Here we report preliminary results on trace element abundances of four SIs of the Elga (IIE) iron. The SIs were analyzed by ICP-MS (40 μm spots) and INAA methods.

Results: Three SIs which were studied consist of euhedral and skeletal augite crystals ($Wo_{37-44}En_{44-50}$; Cr_2O_3 1.5 wt%; Fe/Mn=15-31) embedded in a SiO_2-rich feldspatic ($Ab_{72-92}Or_{7-26}$ to $Ab_{38-43}Or_{53}$) glass. Minor phases of the SIs are pyroxene ($Wo_{1.7}En_{69}$ to $Wo_{2.5}En_{77}$), chromite (TiO_2 5.5 wt%), whitlockite, F-apatite, taenite, troilite, kamacite, pentlandite, schreibersite. The fourth analysed SI is composed from a SiO_2-rich feldspatic ($Ab_{30}Or_{70}$) glass only.

Based on REE patterns glasses were subdivided into 3 types (G1, G2, G3). G1 and G2 are from augite-bearing SIs. G3 is from the glassy inclusions. Augites and G2 glasses demonstrate negative Eu anomalies (Fig.1.). Significantly, Eu was not detected in G1 and G3 glasses, i.e., Eu content is <0.008-0,35 ppm. Augites are enriched in HREEs over LREEs and have distinctly high Sc and Y contents. The G1 glasses vary in REE from 0,2xCI to 2xCI and show flat patterns. They have high contents of Rb (1-20xCI), Nb (1-30 x CI) and strongly depleted in Cr (0,0002xCI). These glasses are complementary to pyroxenes in Sc, Ti, Mn, Hf, Th, Zr, Nb, Rb, Sr, Ba (Fig. 1). Simlar to G1 glasses the G2 ones have a flat REE pattern relatively to CI. In trace el ement abundances (Sc, Ti, Mn, Hf, Th, Zr, Nb, Rb, Sr, Ba) the G2 glasses correspond to a mixture of G1 glasses and augites. The G3 glasses are extremely enriched in Rb (1180xCI), Nb (57xCI), Zr (24xCI), Ba (7xCI) and show also a flat REE pattern (8xCI). Bulk trace element contents measured by INAA in a augite-bearing SI show a prominent negative Eu anomaly and enrichment in LREEs (25xCI) (blue line Fig. 1.).

Discussion: SIs of Elga are more enriched in K, Na, Si and Rb, Nb in comparison with those in other IIE irons. The REE patterns of the Elga SIs indicate a differentiated precursor which were mixed with the Elga IIE metal. The prominent negative Eu anomaly suggests that Ca-plagioclase could be lost during the precursor formation. Our calculations showed that the G2 glass composition can be modeled by mixing: 10Px+90G1 (in wt.%) (see orange line on Fig. 1). It suggests that the glasses could be formed during remelting some portions of SIs.

The bulk REE content obtained by INAA is higher than in augites and glasses and indicate the REE excess could be related with phosphate presence.

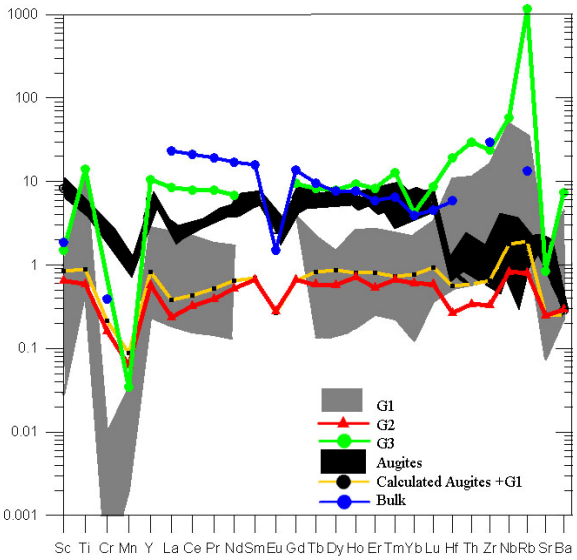

Fig. 1.Trace and REE contents in SIs of Elga meteorite

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