Experimental study of partition of rare elements between minerals and melts of diamond forming eclogite-carbonatite and peridotite-carbonatite systems

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The goal was to study interphase partitioning of trace elements in high-pressure melted eclogite-carbonatite $[[CPx_{40-64}Grt_{16-40}(SiO_2)_{20}]_{59.3}Carb_{39.3}]_{98.6}RE_{1.4}$ and peridotite-carbonatite $[[Ol_{36-60}OPx_{16}CPx_{12-24}Grt_{12-24}]_{30}Carb_{70}]_{99}RE_1$ systems doped with a set of trace elements: Li, Rb, Cs, Ba, Th, U, Ta, Nb, La, Ce, Pb, Pr, Sr, Nd, Zr, Hf, Sm, Eu, Gd, Tb, Dy, Y, Ho, Er, Tm, Yb, Lu, Sc, and Zn. Concentrations of trace elements in coexisting phases were determined using LAICPMS and the mineral-melt partitioning coefficients were calculated. The main feature of the trace element partitioning in high-pressure experiments is the different behaviour of light REE (La, Ce, Pr) in relation to medium and heavy REE (Nd, Zr, Hf, Sm, Eu, Gd, Tb, Dy, Y, Ho, Er, Tm, Yb, Lu). Light REE are partitioned favourably into the melt phase, and the rest REE go into garnet, when the last is presenting. Comparison of the new experimental and published data for partitioning between garnet, clinopyroxene and carbonatite melt, as well as for garnet, clinopyroxene and silicate melt [1-4] shows a similarity in respect of trace element distribution of diamond-forming homogeneous carbonate-silicate melts studied and carbonatite or silicate melts equilibrated with the mantle silicate minerals.

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REE geochemistry, mineralogy and origin of manganese mineralization in the Derbent (Mahkeme Hill), Yozgat (Turkey)

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Artova ophiolite complex is located along the North western and east margin in Yozgat (Turkey). The Mn-deposits in the Derbent area is part of this ophiolite complex. This deposit banded and lenticular forms, is hosted by radiolarite and is generally overlying volcanics. Manyetite, manganite, pyrolusite and goethite are main constituents of the manganese ores in Mahkeme Hill (Derbent-Yozgat) area. The gang minerals in Derbent are quartz and calcite.

In chondrite normalized REE graphics samples are characterized by highly negative and positive Ce anomalies in area. Europium shows negative anomaly in all samples. The negative Ce anomaly is typical to submarine hydrothermal deposits and positive Ce anomaly is indicative of hydrogenous deposits [1]. The negative Eu anomaly shows contamination from the continental crust and/or sediment contribution via dehydration [2].

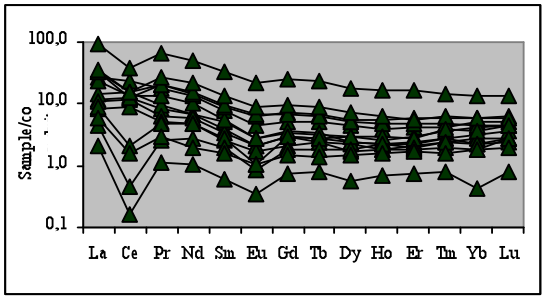

Figure 1: Chondrite normalized REE diagram for ore samples

Ce values in the Mahkeme Hill mineralization were computed and the anomalies were found as $Ce_{anom} < -0.1$ in 9 samples and $Ce_{anom} > -0.1$ in 5 samples. These values are indicative of both oxic and anoxic sedimentation conditions. Chemically, the studied manganese deposit and associated radiolarite are very similar to these formed by hydrothermal – hydrogenous processes.

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