

**Mineralogical and geochemical characteristics of the borate bearing Kirka volcanosedimentary lacustrine basin, Gocenoluk Area, Eskisehir, Western Anatolia, Turkey: Preliminary results**

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In the Gocenoluk (Kirka) area, volcanosedimentary rocks are composed of clays, carbonates, tuffs and borates. XRD (whole rock and clay fractions) and ICP-MS analysis were carried out on samples taken from four different drillholes. In 2008 drilling into the Miocene Gocenoluk (Kirka) borate deposit encountered between 421 and 1204m of drillcore. This project aims to determine the genesis of this mineralization using solution and laser ablation-ICP-MS analyses of ore and gangue minerals. XRD-whole rock analysis show that there are calcite, dolomite, quartz, feldspar, mica, clays and borate minerals (borax, colemanite ulexite minerals, with minor probertite, inyoite, nobleite and kernite), whereas XRD-clay fraction analysis indicate that major clay mineral is smectite, and minor clay minerals are illite, kaolinite and chlorite. In Gocenoluk basin, Ca-borate reacts to form Na-Ca borate and finally Na-borate minerals. The twenty one samples of borate, calcite, dolomite and clay minerals were selected and analyzed by ICP-MS for trace element concentrations. In carbonates the concentrations of Sr and Li increase from 189 to 765ppm and from 27 to 59ppm respectively in direct proportion to vertical with stratigraphic position (from 197 to 738m from top to bottom). Lithium is enriched in borate and clay minerals with concentrations of 61 and 1045ppm, respectively.

**The fluid-absent melting of phase E in the MgO-SiO<sub>2</sub>-H<sub>2</sub>O system**

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Significant amounts of water are recycled into the Earth's interior via hydrous phases in a subducting slab. High pressure experimental investigations have established that several dense hydrous magnesium silicates (DHMS) are stable at mantle conditions in model mantle compositions. These phases act as water carriers in the subducting slab and water so carried may initiate mantle melting, most likely when a subducted slab begins to thermally relax. In the absence of a free fluid at or near transition zone pressures, melting will depend on these hydrated phases. These will break down through fluid-absent melting in perfect analogy to the well known granulite facies fluid-absent melting in crustal rocks. In particular, such fluid-absent melting (of the DHMS or any other hydrous phase) is independent of the termination of the fluid-saturated solidus through a second endpoint.

For the DHMS, nothing is known about the proportions of melt formed through fluid-absent melting, the composition of such melts and the variation in the melt composition at different pressure temperature regimes, which has significant implications for partial melting models of the mantle.

In this study we have experimentally investigated the fluid-absent melting phase relations of the dense hydrous magnesium silicate Phase E, a DHMS phase stable at transition zone conditions of the earth's mantle in a model MgO-SiO<sub>2</sub>-H<sub>2</sub>O system. A stoichiometric oxide mix of Phase E composition was used as the starting material. Rocking multianvil experiments were carried out between 13.5-16 GPa at temperatures ranging from 1000-1600°C using 14/8 and 10/3.5 pressure assemblies. The compositions of the coexisting phases in the quenched run products were analysed using electron microprobe and secondary electron microscopy. The following reactions were found to account for the mineralogical changes observed at the investigated P-T conditions  $E = Fo + En + Melt$ ,  $Hy-wad = E + Fo + En$ ,  $E + En = Hy-wad + Melt$ ,  $E = Fo + Hy-wad + Melt$ ,  $Hy-wad = Fo + En + Melt$  ( E: Phase E, Hy-wad: Hydrous wadsleyite, En: Enstatite, Fo: Forsterite). Preliminary data show complete decomposition of Phase E by 1200°C at 13.5 GPa and by 1100°C at 14.5 GPa producing significant proportions of melt. Further experiments are presently carried out to determine the melt compositions by diamond trap technique in the MSH system and in a model peridotite system.