Mineralogical and geochemical characteristics of clay deposits from Northwest Gonabad District of clay Deposit (East Iran)

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Kaolin deposits, situated approximately northwest of Gonabad (east Iran), have been formed by the intrusion of hydrothermal fluids from granite dike and alteration of rhyolite , dacite and rhyodacite related to the Eocene volcanism [1] . Fore clay deposits have been located in this area. The area is covered by the mikaschist, dacite, rhyolite, trachiandesite, lithic tuff and acidic tuff rocks.

The mineralogical compositions are dominated by quartz, kaolinite, dickite, illite, baidelite and minor phases include chlorite, albite, hematite, montmorilonite, pyrite and gypsum. We analyzed for mineralogical and chemical composition, including the rare earth element contents.

Whole rock chemistry shows that samples rich in SiO_2 and Al_2O_3 . Enrichment of Sr in altered and partially altered rocks relative to fresh volcanic-rock samples demonstrates retention of Sr and depletion of Rb, Ba, Ca, and K during hydrothermal alteration of sanidine and plagioclase within the volcanic units. The chondrite-normalized Rare earth element patterns of the clay deposites show LREE enrichments ((La/Lu)cn = 6.75 to 57.74) and a negative Eu anomaly. The negative Eu anomaly suggests the alteration of feldspar by hydrothermal fluids [2].

The mineralogical composition, REE contents, main elements discrimination diagram and elemental ratios in these deposites suggest a provenance mainly felsic rocks and also, a high amounts of weathering have occurred in Kaolin's source.

[1] Karimpour, MH, Saadat, S., 1384, Report of kaolin deposits in east Iran, 34 pages. [2] Nyakairu G W A, Koeberl C, Kurzweil H (2001) Geochemical Journal 35(4): 245.

Anorthosite dikes from Cyprus: Phase relations in the system $CaAl_2Si_2O_8 – CaMgSi_2O_6 – Mg_2SiO_4$ at 5 Wt.% H_2O

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Massive anorthosite dikes are documented for the first time from the Limassol Forest Complex (LFC) of Cyprus, a deformed equivalent of the Troodos ultramafic massif. Both the Troodos and LFC complexes are part of a Cretaceous oceanic crust that formed within a backarc basin 90 Ma ago and was obduced during late Miocene.

From crosscutting relations with the sheeted dike complex, it follows that the anorthosites belong to one of the latest magmatic events on Cyprus. In hand speciment, the rocks appear massive and unaltered, although in thin section magmatic Pl (An_{93}) is partially replaced by Zo. Where magmatic textures are preserved, Pl forms cm-sized, acicular, radially arranged crystal aggregates reminiscent of spinifex textures.

The origin of these anorthosites remains poorly understood. Even though they occcur as intrusive dikes, it is evident they cannot represent liquid compositions, at least under dry conditions. Whole-sale melting of a pure An_{93} would require temperatures in excess of 1450 °C, which is a quite unrealistic temperature of the modern Earth's crust.

We are exploring experimentally if such lithologies can be generated by medium-pressure fractional crystallisation of hydrous basaltic melts followed by decompression-degassing. High pH_2O stabilizes Ol and Spl but tends to suppress Pl, hence may allow the An-component to be accumulated in late-stage melts. Hydrous melts do occur on Cyprus, in form of high-Ca boninites with ~ 5 wt.% H_2O. Experiments are being performed in the Ol-Cpx-Pl-H_2O system, with Ol (Fo_{95}), Pl (An_{93}), and Cpx (Di_{95}) seperates as starting materials. The seperates are ground, mixed in the desired proportions, then equilibrated with 4 wt.% H_2O at 0.5 GPa total pressure from 1000 to 1300 °C in a piston-cylinder press. Aim is to deliniate the An saturation field in the Ol-Cpx-Pl-H_2O system, and assess to what extent Pl can be suppressed as a liquidus phase in a basalt fractionating under hydrous conditions.

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