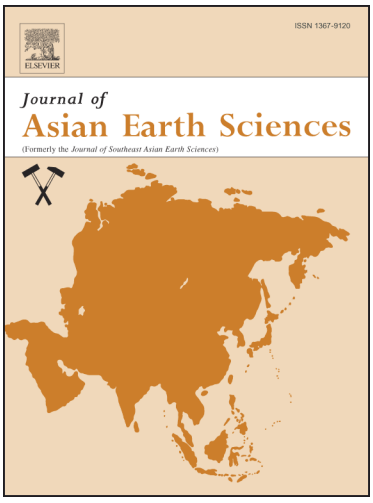

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Prehnite as an indicator mineral in the Wadi Nasb uralitized gabbro, South Sinai, Egypt

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Abstract

We report the first finding of prehnite in the southern Sinai peninsula, in a uralitized gabbro developed at the contact of the appinitic gabbro of the Wadi Nasb mafic intrusion (WNMI) with younger granitic intrusions. Subsolidus reactions with hydrothermal fluids caused the gabbro to gain Al_2O_3 and CaO while losing SiO_2, Fe_2O_3, TiO_2, P_2O_5, Ba, Nb, Zr and Y. Uralitization proceeded through two stages of alteration and mineral replacement. The early stage includes uralitization of pyroxene, formation of new biotite as aggregates of small flakes, transformation of primary amphiboles into actinolite and actinolitic hornblende, and saussuritization of plagioclase. The late stage of alteration is characterized by chloritization of mafic minerals. Apparent crystallization temperatures of the primary relics of pyroxene, hornblende and biotite range from 800-1000 °C, 865-925 °C, and ~700 °C, respectively, suggesting partial resetting of the biotite exchange thermometer. The early biotite-forming alteration occurred at moderate temperature (300-450 °C), while the late chlorite-forming alteration occurred at low temperature (< 300 °C). The prehnite occurs in several forms: (1) fine grained aggregates mostly replacing feldspar and amphibole; (2) prehnite-biotite intergrowths; and (3) small veinlets and vug fillings. The formation of prehnite during the first stage is connected to alteration of pyroxene to secondary amphiboles and of plagioclase to albite, which released the CaO necessary for the