Role of water in continental melting

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The Zanskar region, NW India, exposes the High Himalayan Crystalline (HHC) which is a sequence of medium- to high-grade rocks intruded by many granites. Rocks here underwent early dehydration melting that was later overprinted by water-fluxed melting producing extensive migmatites. Each event is recognizable in the field: early dehydration melting has produced leucosomes with peritectic garnet and sillimanite, in contrast to tourmaline-rich two-mica leucogranites associated with later water-fluxed melting. Potential water source here are the underlying cooler rocks that were heated and dehydrated by the thrusting of the hot rocks of the HHC. This water migrated upwards causing extensive melting of the overlying hot rocks. Water flowed into the hot system along a network of fractures. Melting took place at the fracture walls and as water diffuses a diffusion front was set up with a water content/activity gradient away from it. This gradient is preserved in the rock record as reflected in melt volumes produced and mineral composition. Garnets at the far end of the diffusion front reveal different composition and zoning pattern than garnet close to the diffusion front. Garnet close to the diffusion front reveals either no element zoning or Ca and Mg rich cores, in contrast to well preserved prograde zoning at the far end of the diffusion front. This means that rocks that underwent the same P-T history have preserved a mixed signal that is related to fluctuation in volume of water and/or water activity rather than to changes in P-T conditions. And we suggest that presence of water influnce diffusion rates in garnet.

Clay minerals deposit of Halakabad (Sabzevar- Iran)

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Clay minerals are expanded in south of Sabzevar. They are identified with light color in the filed. The XRD and XRF chemical and mineralogical studies on the Clay minerals indicated that their main clay minerals are Kaolinite, Illite and Dickite. Pyrophyllite is minor clay mineral. Quartz and Sanidine non clay minerals are present with clay minerals. Ratio of Al_2O_3 is about 40 per cent, it is very good for industrial minerals .Volcanic rocks are origin clay minerals. Their composition are basic to acidic. In south of Sabzevar town there is a small part of these rocks available which include volcanic and volcaniclastic rocks. Geochemical and petrographic studies showed that their compositions are generally acidic and intermediates and are of Dacite and Rhyolite and Andesite rocks type that have changed into clay minerals.