Genetic Issues and Perceptions on Some Non Metallic Minerals in Sedimentary Sequences of Lesser Himalaya

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The reserves and prospects of non metallic minerals from Himalaya are significant not only because such materials are fundamental requirement of many industries and essential to infrastructure development, but also because their study help in the understanding the geological evolution. Much of these minerals are hosted within the sedimentary sequences or in the possibly basement crystallines of Lesser Himalaya tectonic zone. Present discussion focuses on magnesite, barite and talc from the sedimentary sequences of Lesser Himalaya mainly emphasize their formation and evolution. Deposits of magnesite are found associated with Neoproterozoic, plateform type/ continental shelf-slope limestone-dolomite host rocks from inner Lesser Himalayan sequences. Minor amount of chert, talc, carbonaceous material and uncommon sulphide minerals occur with this magnesite which is generally coarse grained showing well developed rhombohedral cleavage. The intimate association of stromatolites facilitated the precipitation of magnesium carbonates with a rise in total Mg^{2+} in restricted water. Petrographic observations, geochemical signatures and fluid inclusions trapped in dolomite and magnesite reveal within basin processes, in an increased burial-diagenetic environment responsible for formation of magnesite replacing dolomite. Talc occurs as irregular patches or pockets in these carbonate host rocks, showing close association with magnesite and restricted with dolomite. The magnesite, quartz and talc are intimate partner in an assemblage which shows development of talc at the expense of magnesite and silica. Heterogeneous entrapment of carbonic and aqueous fluid is noticed in localized zones and large scale fluid incursion is absent. Conditions of the transition from diagenetic to metamorphism, and a low X_{CO2} are estimated for the talc formation.

Barite has a typical host rock linkage with Neoproterozoic Nagthat quartzite rocks in outer Lesser Himalaya wherein upto about 2 m thick veins of the barite occur parallel to the bedding surfaces, joints and fractures. Barite textures, fluid inclusion, sulfur and strontium isotopic studies of Lesser Himalayan barite provide an understanding of its deposition and deformation. Two types of barite grains are noticed wherein the early fluid is preserved in barite porphyroclasts. These inclusions are filled with saline aqueous fluids with homogenization temperatures from 112 to 208 °C. The $^{87}Sr/^{86}Sr$ and $\delta^{34}S$ values in barite are analysed. These evidences suggest a fluid mixing model for initial barite deposition whereas barite recrystallisation was linked with Himalayan tectonics. The inferences based on multitude parameters invoke that the initial sedimentation and later fluid migration along fractures during Himalayan tectonic thrusting wrought the present disposition of these deposits.