IRANIAN SOCIETY of CRYSTALLOGRAPHY and MINERALOGY

Vol. 21, No. 4, Winter 1392/2014

IRANIAN JOURNAL of CRYSTALLOGRAPHY and MINERALOGY

Mechanism of silica and dolomite formation in the Upper Jurassic carbonate sediments (Oxfordian-Kimmeridgian-Tithonian?) in the west Bojnurd and Jajarm

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(Received: 9/4/2012, in revised form: 13/10/2012)

Abstract: Upper Jurassic carbonate successions have excellent exposure in Binalud Mountains, west of Bojnurd, northeast and southwest Jajarm area with thickness of about 500m. Chert nodules are present in various shapes such as spherical, elliptical, elongated, discoid and irregular. Silicifications in these deposits are mostly replacement for the carbonate minerals. The presence of carbonate residues in silicified parts of nodules supports this idea. Silica has granular, drusy, radial and mostly microcrystalline fabrics. Microcrystalline quartz in deep facies is mostly containing radiolaria and sponge spicule that indicated organic orgin of silica. Dolomite in these carbonates observed as early and secondary dolomites with different shapes. Four types of dolomites have been identified including fine crystalline (D_1) with no allochem and low quartz grains, secondary fine to medium crystalline replacement dolomites (RD_1 and RD_2) and cements dolomites (CD). On the basis of these data, the studied dolomites have formed penecontemporaneous and early post depositional to shallow burial conditions. Low amount of Na and Sr in dolomites and chert nodules relative to host lime mud indicate the influence of burial diagenetic process on these deposits. In addition, the lower amount of Mn and Fe in chert nodules and dolomites relative to studied limestones that formed in low oxygen conditions, can be related low concentration in dolomitized and silicified fluids and suboxic condition during their formation. Oxygen isotope values of lime mudstones (average -3.1 ‰ VPDB), dolomites (average -3.91 ‰ VPDB) and silica nodules (average -14.82 ‰ VPDB) indicate the influence of burial digenetic process. Based on oxygen isotope values, the formation temperature of studied dolomites is about 54 to 68°C.

Keywords: *Silicification; dolomitization; nodule; Upper Jurassic; west Bojnurd; Jajarm.*

متن فارسی اصل مقاله از صفحه ۷۴۳ تا ۷۵۶ در این شماره به چاپ رسیده است.

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