

Applications of cathodoluminescence, stable isotopes and fluid inclusions for identification and interpretation of dolomites of the Padeha Formation at Tabas Block, Central Iran

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(Received: 23/7/2013, in revised form: 15/11/2013)

Abstract: For identification and differentiation of different types of dolomites of the Padeha Formation, three stratigraphic sections in the northern and southern Tabas Block, with the maximum amount of dolomite, were selected and sampled. Based on petrographic evidence and geochemical data, three types of dolomite were identified, including primary (PD), replacement (RD) and vein and pore filling (VD) dolomites. The PD dolomites are fine-grained, anhedral with fenestral fabric and have sedimentary structures such as planar lamination, mud cracks, stromatolite and teepee structures, as well as dark and dark-red luminescence. The RD dolomite is mainly replaced the matrix and fossil fragments and observed as subhedral with orange to red luminescence. The VD dolomite is often coarse-grained and euhedral and according to the intensity of luminescence, six petrotypes were identified in this type of dolomite. The PD and RD dolomites indicate a similar range of geochemical data that reflects they formed in similar conditions. Based on oxygen isotopes, these dolomites formed at temperatures of 44 °C and 59 °C, respectively. Therefore, marine and very shallow burial model is the most probable model for the formation of PD and RD dolomites. The VD dolomite has the lightest oxygen isotope values, therefore on this basis, this type of dolomite is formed at 82 °C. Moreover, the study of fluid inclusions in these dolomites shows an average temperature of 83 °C. The VD dolomite has likely formed in deep burial conditions and burial dolomitization model is proposed for this type of dolomite.

Keywords: *dolomite; petrography; geochemistry; Padeha Formation; Central Iran.*

متن فارسی اصل مقاله از صفحه ۶۳۱ تا ۶۴۶ در این شماره به چاپ رسیده است.

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