

Application of fluid inclusion and cathodoluminescence to recognize of paragenetic sequence in Jurassic carbonate: Case study of Zagros sedimentary basin in SW Iran

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Abstract

Fluid inclusion analysis and cathodoluminescence photography can be a good approach for studying trend diagenesis of dolomite and calcite cements in relation with diagenesis environmental and also a good approach to exhibit paragenetic sequences for them. The Jurassic sediments in the southwest of Iran are typically composed of shallow-water limestones and dolomites which are called Surmeh formation. Petrographic observation of the Surmeh formation reveals the presence of 10 different cements related to various diagenetic environments. Most diagenetic systems are closely linked to temperature and salinity of the fluid, thus fluid inclusions are sensitive indicators of paleotemperature of diagenetic environments. This study attempts to determine the temperature of cement precipitation, the salinity of the fluid from which the cement precipitated and the diagenetic environments. The reported results of fluid inclusion, petrographic and microthermometric analysis provide the base for some consideration about diagenetic history of the sedimentary sequence. In this research frequency histograms of Th (temperature of homogenization) and bivariate plot of Th and $T_{m_{ice}}$ (temperature of final ice melting) shows distinct areas for each cement. Based on petrographic observation and fluid inclusion data reveals that timing of precipitation of cements in this sequence, from marine diagenesis to deep burial diagenesis such as: isopachous fibrous calcite, drusy calcite, equant calcite, blocky calcite, void filling dolomite, platy calcite, syntaxial calcite, poikilotopic calcite, fracture filling calcite and fracture filling dolomite. Cathodoluminescence observation confirm these conclusions.

Keywords:

Fluid inclusion, Cathodoluminescence, temperature of homogenization, Zagros basin.