

Identification of Clay Mineral for Determining Reservoir Maturity Levels Based on Petrographic Analysis, X-Ray Diffraction and Porosity Test on Penosogan Formation Karangsembung Sub-District Kebumen Regency Central Java

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Abstract : The Penosogan Formation sandstone, that has Middle Miosen age, has been deemed as a reservoir potential based on sample data from sandstone outcrop in Kebakalan and Kedawung villages, Karangsembung sub-district, Kebumen Regency, Central Java. This research employs the following analytical methods; petrography, X-ray diffraction (XRD), and porosity test. Based on the presence of micritic sandstone, muddy micrite, and muddy sandstone, the Penosogan Formation sandstone has a fine-coarse granular size and middle-to-fine sorting. The composition of the sandstone is mostly made up of plagioclase, skeletal grain, and traces of micrite. The percentage of clay minerals based on petrographic analysis is 10% and appears to envelop grain, resulting enveloping grain which reduces the porosity of rocks. The porosity types as follows: interparticle, vuggy, channel, and shelter, with an equant form of cement. Moreover, the diagenesis process involves compaction, cementation, authigenic mineral growth, and dissolving due to feldspar alteration. The maturity of the reservoir can be seen through the X-ray diffraction analysis results, using ethylene glycol solution for clay minerals fraction transformed from smectite-illite. Porosity test analysis showed that the Penosogan Formation sandstones has a porosity value of 22% based on the Koeseomadinata classification, 1980. That shows high maturity is very influential for the quality of reservoirs sandstone of the Penosogan Formation.

Keywords : sandstone reservoir, Penosogan Formation, smectite, XRD

Conference Title : ICGS 2019 : International Conference on Geological Sciences

Conference Location : Vienna, Austria

Conference Dates : June 20-21, 2019