Controlling factors and formation mechanism of fractures in the tight-gas sandstones of the Upper Triassic Xujiahe Formation, western Sichuan Basin, China

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Based on cores, image logs and thin sections, five sets of fractures are developed in the study area, where faults are developed. Most of fractures are open without fillings, and some fractures are filled with calcite, quartz, bitumen, pyrite and mud. Fractures are mainly controlled by lithology, mechanical stratigraphy and faults. Based on mutual crosscutting relationships of fractures, mineral filling sequence of fracture fillings, fluid inclusion and carbon-oxygen isotope analysis of calcite fillings in fractures, and quartz spintronic resonance analysis of quartz fillings in fractures, in combination with thermal and burial history, the formation sequence and time of fractures were analyzed. The results show that fractures mainly formed over three period, that is, the late Triassic, Middle to Late Jurassic, and Late Cretaceous to Paleogene. Then, combined with the paleostress evolution and fracture characteristics of the study area, the formation mechanism of fractures was discussed.