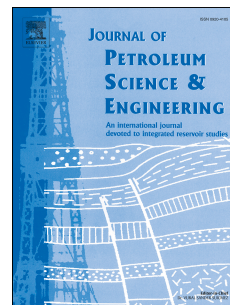


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Experiments and Analysis on Hydraulic Sand Fracturing by an Improved True Tri-axial Cell

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Abstract: In this paper, a hydraulic sand fracturing physical modelling experimental equipment is designed, in which different pumping stages are considered, and pad fluid, sand-carrying fluid, and displacing fluid are continuously injected into the core following certain ratio. Then, hydraulic sand fracturing experiments are conducted separately in the natural coal and shale specimens using this equipment. The characteristics of proppant migration and distribution and their influences on the initiation and propagation of hydraulic fractures are investigated. The testing results show that fracture morphologies after hydraulic fracturing in coal and shale have significant differences. Hydraulic fractures in the coal are affected by cleats, while the propagation of hydraulic fractures in shale is mainly influenced by natural fractures. Almost all the proppants are distributed around the wellbore. The migration distance of proppants is limited. When there are natural fractures around the wellbore, proppants can plug the natural fractures. Secondary fractures will occur in the shale, and multiple fractures are formed. The practice shows that based on the restoration of field fracturing process, this equipment can be used to analyze the initiation and propagation of hydraulic fractures in sand fracturing.

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