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Tribological properties of sliding quartz sand particle and shale rock contact under water and guar gum aqueous solution in hydraulic fracturing

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Abstract

The tribological performances of proppant particle-shale rock contact determine the quality of hydraulic fracturing. In this work, the tribological property of quartz sand particle-shale rock contact was investigated. The friction of the contact is highly affected by lubricating media at the interface and water saturation state of the particles and the shale rock, which is related to water as a lubricant for the contact and sand particles softened by absorbing water, respectively. Under lubrication by guar gum aqueous solution, the friction of the contact was found to change with guar gum concentration while normal load and sliding speed exhibited little influence.

Keywords: shale rock, quartz sand, guar gum, hydraulic fracturing.

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