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能源和环境工程

稠油包水乳状液的表观黏度

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摘要

以渤海SZ36-1稠油、矿化水为工质配制了2组不同液滴直径的W/O型乳状液，研究了温度、含水率、剪切率和液滴直径对乳状液黏度的影响。结果表明，温度对乳状液表观黏度的影响非常明显，而对相对黏度的影响却较小；同时含水率、剪切率和液滴直径也是影响乳状液黏度的重要因素，低含水率下，剪切率、液滴直径对黏度的影响不明显，而当含水率较高时，剪切率、液滴直径的影响非常突出，乳状液呈现出强烈的剪切稀释特性。利用国内外现有的一些黏度模型对实验获得的黏度数据进行了预测分析，发现Brinkman(1952)模型具有较好的预测精度。

关键词

稠油 W/O型乳状液 表观黏度 相对黏度

分类号

Apparent viscosity of water-in-heavy crude oil emulsion

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Abstract

Two series of water-in-oil emulsions with different droplet size distributions were prepared by using Bohai SZ36-1 oilfield heavy crude oil and mineral water.The effects of temperature, water volume fraction, shear rate and droplet average diameter on emulsion viscosity were studied.The results showed that temperature had a great impact on apparent viscosity of emulsion, but seemingly little impact on relative viscosity.Water volume fraction, shear rate and droplet average diameter were also important factors affecting viscosity.At a low water volume fraction, shear rate and droplet average diameter’s effect could be ignored, however, when water volume fraction increased, their effects will be greatly enhanced and W/O emulsion showed strong shearing-thin behavior.Some published viscosity prediction models were evaluated by using data from the experiment, and the Brinkman (1952) model was found to be the best.

Key words

heavy crude oil water-in-oil emulsion apparent viscosity relative viscosity

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