

多相流

一种界面活性剂减阻溶液的流变特性

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摘要 利用ARES流变仪对具有湍流减阻作用的阳性界面活性剂CTAC/NaSal水溶液的剪切黏度进行了测量。溶液的质量浓度范围为 $5 \times 10^{-5} \sim 2 \times 10^{-4}$, 温度范围为 $20 \sim 40^\circ\text{C}$ 。对实验数据的分析发现, Giesekus模型可较好地拟合不同浓度和温度下界面活性剂溶液的剪切黏度。得到了不同溶液浓度下Giesekus模型参数与温度的关联式, 从而揭示了溶液减阻特性与其流变特性的内在联系。利用对向喷嘴装置RFX流变仪对CTAC/NaSal水溶液的拉伸黏度进行了测量。

关键词 [流变特性](#) [界面活性剂](#) [减阻](#) [Giesekus模型](#)

分类号

Rheological characteristics of drag-reducing surfactant solution

Abstract

The shear viscosities of a turbulence drag-reducing cationic surfactant solution, cetyltrimethyl ammonium chloride (CTAC)/sodium salicylate (NaSal) aqueous solution were measured with ARES rheometer. The concentration and temperature of the solution ranged from 5×10^{-5} to 2×10^{-4} and 20°C to 40°C , respectively. The Giesekus model was found to fit the measured shear viscosities well for different temperatures and concentrations of the surfactant solution. The model parameter values obtained by fitting were correlated with temperature at certain solution concentrations, and the relationship between drag reduction and rheological characteristics of the surfactant solution was established. The elongational viscosities of CTAC/NaSal surfactant solution were also experimentally investigated with an opposing jet RFX rheometer.

Key words [rheological characteristics](#) [surfactant](#) [drag reduction](#) [Giesekus model](#)

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