

环境科学与工程

钠蒙脱土颗粒对聚驱采油污水乳化稳定性的影响

卢凤娟<sup>1</sup>,李玉江<sup>1\*</sup>,孙德军<sup>2</sup>,吴涛<sup>2</sup>

- 1. 山东大学环境科学与工程学院, 山东 济南 250100;
- 2. 山东大学胶体与界面化学教育部重点实验室, 山东 济南 250100

摘要:

通过室内实验方法研究了钠蒙脱土颗粒对聚驱采油污水油水分离性能和油水界面性质的影响。采用界面张力仪和Zeta电位仪研究了钠蒙脱土颗粒对聚驱采油污水中油滴Zeta电位、油水界面张力和界面扩张黏弹模量的影响。在光学显微镜下,观察钠蒙脱土颗粒在油滴表面的吸附状态。结果表明,当钠蒙脱土颗粒质量浓度低于200mg/L时,随其质量浓度增大、Zeta电位下降、界面张力降低、黏弹模量提高,采油污水中出现稳定液滴型(oil-mineral aggregate,OMA)结构,此时钠蒙脱土颗粒对聚驱采油污水稳定性影响比较显著,采油污水处于比较稳定的阶段。当其质量浓度大于250mg/L后,Zeta电位基本不再下降,而界面张力略有提高,黏弹模量也有增大,颗粒油滴形成大的聚集体结构,油滴更容易发生聚并,聚驱采油污水稳定性变差,从而更易于处理。

关键词: 聚驱采油污水 界面张力 黏弹模量 Zeta电位 OMA结构

Effects of Na-montmorillonite particles on emulsification stability of polymer flooding produced water

LU Feng-juan<sup>1</sup>, LI Yu-jiang<sup>1\*</sup>, SUN De-jun<sup>2</sup>, WU Tao<sup>2</sup>

- 1. School of Environmental Science and Engineering, Shandong University, Jinan 250100, China;
- 2. Key Laboratory of Colloid Interface Chemistry of the Ministry of Education, Shandong University, Jinan 250100, China

Abstract:

The effects of Na-montmorillonite(Na-Mt)particles on the oil-water interfacial properties and oil-water separation of polymer flooding produced water were experimentally investigated. By using an interfacial rheometer and Zeta potentiometer to analyze the influences of Na-Mt particles on Zeta potential, interfacial tension and dilational viscoelasticity of polymer flooding produced water, and the adsorption of the Na-Mt particles on oil droplets was observed under optical microscopy. The result showed that with the Na-Mt particles concentration increasing, and when the Na-Mt particle concentration was less than 200mg/L, the Na-Mt particles could cause the Zeta potential of oil droplets to rapidly decrease, interfacial tension to decline and dilational viscoelasticity to be enhanced. The results also showed that a stable oil-mineral aggregate(OMA) structure appeared in polymer flooding produced water, which had noticeable effects on emulsification stability of polymer flooding produced water. The polymer flooding produced water was stable in this stage. When Na-Mt particle concentration was higher than 250mg/L, the Zeta potential of oil droplets keeps stable, while interfacial tension and dilational viscoelasticity showed a slight increase. The system formed a large oil-mineral aggregate structure, which was apt to aggregate, and could enhance the treatment of polymer flooding produced water.

Keywords: polymer flooding produced water interfacial tension dilational viscoelasticity; Zeta potential OMA structure

收稿日期 2010-10-14 修回日期 网络版发布日期

DOI:

基金项目:

国家高技术研究发展计划资助项目(2009AA063901-5); 高校院所自主创新计划资助项目(201004043)

通讯作者: 李玉江(1963-),男,山东章丘人,教授,博士,硕士生导师,主要研究方向为水处理理论与技术. E-mail: yujiang@sdu.edu.cn

作者简介: 卢凤娟(1985-),女,河南商丘人,硕士研究生,主要研究方向为水污染防治理论与技术. E-mail: lufengjuan66@126.com

作者Email: yujiang@sdu.edu.cn

PDF Preview

扩展功能
本文信息
Supporting info
PDF(1111KB)
参考文献[PDF]
参考文献
服务与反馈
把本文推荐给朋友
加入我的书架
加入引用管理器
引用本文
Email Alert
文章反馈
浏览反馈信息
本文关键词相关文章
聚驱采油污水
界面张力
黏弹模量
Zeta电位
OMA结构
本文作者相关文章
PubMed

---

参考文献:

本刊中的类似文章

---

Copyright by 山东大学学报(工学版)