

论文

水凝胶体系交联过程织构变化的流变学研究

王刚¹, 许元泽¹, 范学勃¹, 曹绪龙², 刘坤², 张继超²

1. 复旦大学高分子科学系, 聚合物分子工程教育部重点实验室, 上海 200433;
2. 中国石化胜利油田有限公司地质科学研究院, 东营 257015

摘要:

研究了由部分水解聚丙烯酰胺水溶液交联得到的用于三次采油的弱凝胶体系, 使用不同交联剂的水凝胶体系表现出不同的流变特性, 反映两种不同织态结构的弱凝胶, 一种为接近于均匀分形交联网的整体凝胶, 另一种为有特征尺度的非均匀交联网的胶态分散凝胶. 上述结果得到了光学显微镜观测的证明. 强剪切和拉伸流的结果表明, 当凝胶体系中存在大量胶团时, 强剪切可以加强体系中网络结构的完整性, 使得流变性质加强, 不同于一般凝胶的减弱趋势.

关键词: 水解聚丙烯酰胺 弱凝胶 流变性 凝胶织构 拉伸黏度

Texture and Rheology of the Gelation Process of HPAM Aqueous Solution

WANG Gang¹, XU Yuan-Ze^{1*}, FAN Xue-Qin¹, CAO XU-Long², LIU Kun², ZHANG Ji-Chao²

1. Key Laboratory of Molecular Engineering of Polymers of Ministry of Education, Department of Macromolecular Science, Fudan University, Shanghai 200433, China;
2. Geological Scientific Research Institute of Shengli Oilfield, SINOPEC, Dongying 257015, China

Abstract:

The weak gels based on partial hydrolyzed polyacrylamide(HPAM) aqueous solutions gelled by organic crosslinkers were investigated rheologically with application background of tertiary oil recovery. The linear and non-linear rheological properties in gelation processes of weak gels with different crosslinkers reveal two kinds of textures near the gel point, one is a fractal network, and the other is a heterogeneous network with a characteristic dimension. The optical microscopic approved the rheological arguments. High shearing and the stretch flow in converging outlet measurements indicat that contrary to the static colloidal gels, the strong flows can reinforce the integrities of network structures and enhance the rheological properties. The potential in the EOR applications are also discussed.

Keywords: Hyalrolyzed polyarylamide Weak gel Rheology Gel texture Elongational viscosity

扩展功能

本文信息

Supporting info

PDF(640KB)

[HTML全文](0KB)

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

▶ 水解聚丙烯酰胺

▶ 弱凝胶

▶ 流变性

▶ 凝胶织构

▶ 拉伸黏度

本文作者相关文章

▶ 王刚

▶ 许元泽

▶ 范学勃

▶ 曹绪龙

▶ 刘坤

▶ 张继超

▶ 王刚

▶ 许元泽

▶ 范学勃

▶ 曹绪龙

▶ 刘坤

▶ 张继超

PubMed

Article by

Article by

Article by

Article by

Article by

Article by

Article by

Article by

Article by

Article by

Article by

DOI:

基金项目:

通讯作者: 许元泽

作者简介:

参考文献:

1. SHEN Ping-Ping(沈平平). China Basic Science(中国基础科学)[J], 2000, (8): 4—8
2. YANG Cheng-Zhi(杨承志). Increase Oil Recovery Using Chemical Flooding(化学驱提高石油采收率)[M], Beijing: Petroleum Industry Press, 1999
3. ZHANG Ji-Cun(张继存). Tertiary Oil Recovery(三次采油)[M], Beijing: Petroleum Industry Press, 1995
4. SUN Huan-Quang(孙焕泉), ZHANG Kun-Ling(张坤玲), CHENG Jing(陈静), *et al.*. Acta Polymerica Sinica(高分子学报)[J], 2006, (6): 810—814
5. SHUN Huan-Quan(孙焕泉), ZHANG Yi-Gen(张以根), CAO Xu-Long(曹绪龙). Polymer Flooding Technology(聚合物驱油技术)[M], Dongying: Petroleum University Press, 2002
6. HOU Wan-Guo(侯万国), ZHU Wei-Qun(朱维群), LIU Shang-Ying(刘尚营), *et al.*. Chem. J. Chinese Universities(高等学校化学学报)[J], 1999, 20(12): 1948—1950
7. WANG Ke-Liang(王克亮), YANG Jing(杨靖), ZHEN Jing(甄静). Petroleum Geology and Research in Daqing(大庆石油地质与开发)[J], 1999, 18(2): 38—40
8. CHEN Tie-Long(陈铁龙), ZHENG Xiao-Chun(郑晓春), WU Xiao-Ling(吴晓玲). Oil Field Chemistry(油田化学)[J], 2000, 17(1): 62—65
9. Ghannam M., Esmail N.. Journal of Applied Polymer Science[J], 2002, (85): 2896—2904
10. Kabo V. Y., Manyrin V. N., Rummyantseva E., *et al.*. Method of Selecting Gelating Compositions for Increasing Oil Recovery of Strata, RU 2180039[P], 2002
11. Steven L. B., Martin B., Thomas P. L.. Journal of Petroleum Science and Engineering[J], 1997, (17): 197—209
12. Scanlan J. C., Winter H. H.. Macromolecules[J], 1991, 24(1): 45—74
13. Winter H. H., Izuka A., Derosa M. E.. Polymer Gels and Networks[J], 1994, 2(3/4): 129—245
14. Kizilay M. Y., Okay O.. Polymer[J], 2003, 44(18): 5239—5250
15. Winter H. H., Chambon F.. Journal of Rheology[J], 1986, 30: 367—382
16. YANG Jian-Mao(杨健茂), CAO Xu-Long(曹绪龙), ZHANG Kun-Ling(张坤玲), *et al.*. Chem. J. Chinese Universities(高等学校化学学报)[J], 2006, 27(3): 579—582
17. Cogswell F. N.. Polyhmer Engineering & Science[J], 1972, 12: 64
18. XU Yuan-Ze(许元泽). Structural Rheology of Polymer(高分子结构流变学)[M], Chengdu: Sichuan Education Press, 1988
19. XU Yuan-Ze(许元泽), Zhang Xiu-Juan(张秀娟). An Inverted High Resolution Polarizing Microscope with Long Working Distance and High Temperature Resistance Hot Stage(倒置偏光长工作距离高分辨率耐高温热台显微镜), CN 2007200666499[P], 2007
20. ZHANG Xiu-Juan(张秀娟), YI Xiao-Su(易小苏), XU Yuan-Ze(许元泽). Acta Polymer Sinica(高分子学报)[J], 2007, (8): 725—730
21. ZHANG Kun-Ling(张坤玲), LI Zhen-Quan(李振泉), LIU Kun(刘坤), *et al.*. Acta Polymerica Sinica(高分子学报)[J], 2006, (3): 516—522

本刊中的类似文章

1. 林梅钦, 董朝霞, 李明远, 吴肇亮. 低浓度HPAM/AICit交联体系的²⁷Al NMR研究[J]. 高等学校化学学报, 2007,28(8): 1573-1576
2. 燕永利, 何飞, 张家明, 屈撑国, 张宁生. 单一非离子表面活性剂制备胶质气体泡沫的稳定性[J]. 高等学校化学学报, 2008,29(10): 2044-2048
3. 梁虎南, 龙柱, 皮成忠, 杨淑蕙, 周小凡. 阴离子分散剂对酸化膨润土流变性的影响[J]. 高等学校化学学报, 2009,30(3): 549-552

文章评论

| 序号 | 时间 | 反馈人 | 邮箱 | 标题 | 内容 |
|----|----|-----|----|----|----|
|----|----|-----|----|----|----|

1 2009-
11-16

frsahfkjsdagjk

hsjkafh@sdk.com

ugg boots

Ugg Ugg Shoes S:
Sale Cheap Ugg
Cheap Uggs ugg