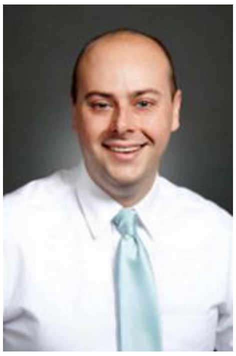
中 国 石 油 大 学（北 京）
China University of Petroleum-Beijing

学 术 讲 座

New Insights and Mechanisms for Chemical Enhanced Oil Recovery using Polymers



主讲人：Matthew T. Balhoff 副教授

主持人：张广清 教授

邀请单位：中国石油大学（北京）石油工程学院

讲座时间:2019年01月10日(周四)上午9:30-11:00

讲座地点：第三教学楼107教室

主讲人简介：

Matthew T. Balhoff，美国德州大学奥斯汀分校副教授，博导。2005年于美国路易斯安那州立大学取得博士学位。2005年至今就职于美国德州大学奥斯汀分校，历任博士后（2005-2007）、助理教授（2007-2013）、副教授（2013至今）。发表期刊论文58篇，国际会议论文25篇。所获奖励包括：国际石油工程师协会（SPE）杰出会员奖（2017）、国际石油工程师协会北美西南区油藏描述与动力学奖（2017）、德州大学奥斯汀分校教务长教学奖（2017）等。

Abstract:

Water-based polymers are often used to improve oil recovery beyond a waterflood by improving the mobility ratio and increasing sweep efficiency. However, polymer floods are not expected to affect residual (trapped) oil saturation. In this work, it is shown hat polymers, particularly those that are viscoelastic, can reduce residual oil saturation.

Bentheimer and Berea sandstone cores were saturated with either high (120cp) or low (< 10 cp) viscosity oil and then waterflooded to residual oil saturation. These floods were followed by injection of a water-based polymer, hydrolyzed polyacrylamide (HPAM), that was non-Newtonian and viscoelastic. Significant reduction in residual oil saturation was observed for all core floods when the polymer had significant elasticity, which contradicts conventional wisdom of the efficiacy of polymer flooding (improved sweep but not recovery of capillary trapped oil). Experiments in glass microfluidic channels and micromodels show unique flow behavior, including oscillation of oil droplets, at pores. Computational fluid dynamics modeling is used to explain the pheneomena by calculating the forces acting on a trapped oil droplet by a viscoelastic fluid. Finally, field scale simulations are performed for a real pilot study using a chemical flooding reservoir simulator. It is shown that viscoelastic polymer results in significantly larger recovery than even polymer floods that are not viscoelastic.