数学与系统科学研究院

计算数学所学术报告

报告人：　　**Prof. Jian Li**

（***School of Mechanical Engineering ，The University of Western Australia, Australia*** ）

报告题目：

Numerical Simulation of Two-Phase Flow and Solute Transport During Microbial Enhanced Oil Recovery

邀请人：　　徐国良研究员

报告时间：**2010** 年 **9** 月 **28** 日（周二）

上午 **10：00**

报告地点：　　科技综合楼三层 **311**

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Abstract:

Microbial enhanced oil recovery (MEOR) is a potential low cost method for increasing oil recovery and improving sweep efficiency. Residual oil saturation reduction and microbial plugging are two crucial factors in the MEOR processes. Before MEOR field applications can be performed with confidence, it is important to understand key mechanisms and quantitative relationships between microbial metabolism, permeability, interfacial tension and residual oil saturation. In this study, a fully coupled finite element model of the MEOR processes in homogeneous and heterogeneous porous media is presented. This model includes biological and hydrological processes and also describes how the interfacial tension reduces the residual oil saturation. Numerical simulations of core flooding experiments are performed to investigate the influence of different parameters controlled the onset of oil mobilization on the residual oil saturation. Results show that the oil mobilization has significant effects on the residual oil saturation and the oil recovery in heterogeneous porous media. Numerical results also show that the porosity and permeability reductions in the MEOR processes are significant. Water contents and bacterial concentrations for heterogeneous porous media are compared with those for homogenous porous media, respectively. Simulations using a sandstone porosity distribution measured via X-ray CT show that the heterogeneity of the rock has a significant effect on the MEOR processes.

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