Contribution ID: **483** Type: **Oral Presentation**

A proposal to model non-uniform mixing of polymers in flows of shear-thinning polymers in porous media during enhanced oil recovery by polymer flooding

Tuesday 20 May 2025 12:50 (15 minutes)

In modeling flows of shear-thinning polymers in porous media, it is usually assumed that the polymer is uniformly mixed in the aqueous phase in space and time. However, this is rarely the case after an initial period of flow through the porous media. Even though there does not exist any theory of how the non-uniformity in mixing develops in time and space, we propose a modeling approach to include initial non-uniform distribution of polymer in the aqueous phase. We perform numerical simulations of polymer flooding using a hybrid method [1,2] to evaluate the effect of such non-uniform mixing of shear-thinning polymer [3] on the porous media flow and oil recovery. We will present results for several levels of non-uniform mixing for two polymers at multiple injection rates and initial polymer concentrations.

Publications Reference:

[1] Prabir Daripa and Sourav Dutta, Modeling and Simulation of Surfactant-Polymer Flooding using a New Hybrid Method, J. Comp. Phys., 335, pp. 249-282, 2017.
[2] Prabir Daripa and Sourav Dutta, On the convergence analysis of a hybrid numerical method for multicomponent transport in porous media, Appl. Num. Math.,146, 199-220, 2019.
[3] Prabir Daripa and Rohit Mishra, Modeling shear-thinning polymer flooding using a dynamic viscosity model, Physics of Fluids, Vol. 35, 046606 (2023).

Country

United States

Acceptance of the Terms & Conditions

Click here to agree

Student Awards

Water & Porous Media Focused Abstracts

References

[1] Prabir Daripa and Sourav Dutta, Modeling and Simulation of Surfactant-Polymer Flooding using a New Hybrid Method, J. Comp. Phys., 335, pp. 249-282, 2017. [2] Prabir Daripa and Sourav Dutta, On the convergence analysis of a hybrid numerical method for multicomponent transport in porous media, Appl. Num. Math.,146, 199-220, 2019. [3] Prabir Daripa and Rohit Mishra, Modeling shear-thinning polymer flooding using a dynamic viscosity model, Physics of Fluids, Vol. 35, 046606 (2023).

Author: DARIPA, Prabir (Texas A&M University)

Presenter: DARIPA, Prabir (Texas A&M University)

Session Classification: MS07

Track Classification: (MS07) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes