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INVESTIGATION ON EFFECTS OF VISCOELASTICITY ON SWEEP EFFICIENCY

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Ability of a viscoelastic fluid to remove trapped oil from dead end in a micropore, has been investigated in different operational conditions and fluid properties. Non-linear viscoelastic Double Convected Pom-Pom (DCPP) model has been used for describing rheological behavior of flooding polymer solution. A finite-volume-based numerical approach on a structured grid with Discrete Elastic Viscous Stress Splitting (DEVSS) technique has been used to solve the motion equations of and fluid constitutive equation for the steady, isothermal and incompressible fluid past through a two-dimensional micropore. The contours of velocity, stream function, shear stress and pressure are drawn and micro-scale sweep efficiency is calculated qualitatively.
The obtained results show that the viscoelastic nature of the displacing polymer fluids can considerably improve oil removing efficiency in pores compared to the Newtonian and generalized Newtonian fluids. This conclusion could be vital in selecting appropriate polymer and polymer concentration for flooding fluids and operational conditions in polymer flooding process.