Delivery of Remedial Amendments to Lower-Permeability Zones through Fluid Viscosity Modifications

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Abstract. Laboratory experiments and numerical studies have been conducted to investigate the use of a shear-thinning polymer (Xanthan gum) to improve access to low-permeability zones in heterogeneous systems. The impact of polymer concentration, fluid injection rate, and permeability contrast in the heterogeneous systems has been studied in a series of eleven two-dimensional flow-cell experiments. The Subsurface Transport over Multiple Phases (STOMP) simulator was modified to include polymer-induced shear thinning effects. The experimental and simulation results clearly show that using the polymer leads to an enhanced delivery of remedial amendments to lower permeability zones and an increased sweeping efficiency. The modified STOMP simulator was able to predict the experimental observed fluid displacing behavior well.

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