

Experimental Development of Adsorption and Desorption Kinetics of a CO₂-Foaming Surfactant Onto Berea Sandstone

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Abstract

Results of eight series of adsorption and seven series of desorption experiments of CO₂ foaming surfactant CD1045 onto and from Berea sandstone, each with a different initial concentration, are presented in this paper. Non-linear pseudo first and second order kinetic models for adsorption and desorption processes were derived. A simplex optimization method was adapted for the calculation of kinetic parameters of these models. This method can be used for calculating not only the kinetic model parameters, but also the absolute errors between the model and the measurements, and thus the fitness of the model. Using this simplex method and the experimental results, the adsorption and desorption processes of CD1045 onto and from Berea sandstone were found to follow pseudo second order adsorption model and pseudo first order desorption model, respectively.