Numerical Modeling and Economical Evaluation of Low Salinity Waterflooding in a Tight Carbonate Reservoir in North Oman

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Abstract

In this work, literature survey was first carried out on hydrocracking process, configurations and applications. Then, a single stage hydrocracking with two reactors and the beds in each was modeled using lumping approach. Lumps were selected according to their boiling point ranges. A hydrocracker was modeled successfully and good results were obtained using the reported operating conditions and feed properties. The results were then calibrated to agree with plant operation using fine tuning. It was found that the model generates good predictions on temperature profile of reactors, H2 mass balance, compositions, and yields with an error less than 1%. Next, the model was optimized. It was carried out by searching for the operating conditions that would result to the highest production of light products. The effect of the temperature and flow rate on the product yields was investigated for the temperature range of 365 oC to 385 oC and five mass flow rates (6717, 7971, 91171, 103171, and 115171 kg/h). Generally, best results of high yields obtained at high weight average reactor temperature (WART) and low flow rate. Separation section was then simulated and modeled with two separators to connect it to the reactor section to complete the hydrocracking process modeling. From the results of the fractionator products, it’s obvious that the model could predict values similar to the plant data.