Maria Astrid Centeno et al., J Pet Environ Biotechnol 2016, 7:4(Suppl)
http://dx.doi.org/10.4172/2157-7463.C1.019

Comparative laboratory and simulation study of EOR polymer flooding at high salinity conditions

Maria Astrid Centeno, Alexandre Breda and **Pedro Diaz**
London South Bank University, UK

The success of polymer flooding as a method of oil recovery has been attributed to the profile control mechanism depending on properties such as viscosity, concentration and molecular weight. As polymers are injected in the reservoir, are exposed to chemical, physical and mechanical degradation processes depending on reservoir characteristics, fluids, temperature and pressure. Therefore an extensive screening process that include evaluation of variables such as polymer stability to salinity, temperature and flow conditions between others need to be considered in the selection of the best system for EOR(Enhanced Oil Recovery) for any particular oilfield screening case. A systematic study and screening of commercial polymer PHPA (Partially Hydrolysed Poly Acrylamide) and modified comb-polymer for effective application on a sandstone reservoir under high salinity multicomponent brine, with divalent ions Ca^{2+} and Mg^{2+} is presented. Polymer HPAM (hydrolyzed polyacrylamide) of different molecular weights was compared with special modified co-polymers. Rheological results were adjusted according to correlation between viscosity, salinity, shear rate and polymer concentration. Core flooding experiments were performed using a sample of crude oil from the North Sea that has specific gravity 21°API and Bernheimer sandstone core samples. Synthetic brine was prepared considering a composition of production water from a reservoir at the North sent Sea with high content of divalent ions Ca^{2+} and Mg^{2+}. The reported viscosity of polymer solution increases with polymer concentration. There was a stronger effect for high molecular weight polymer, whereas viscosities of copolymers were less affected by polymer concentration than PHPA polymers. Core flooding experiments were numerically simulated to compare the efficiency of the different polymers. Results showed that polymer PHPA with high molecular weight (MW) can be effective for EOR applications because less amount of polymer is required to achieve high viscosity under high salinity conditions. However, this polymer was more affected by changes in shear rate than polymers with low molecular weight.

Biography

Maria Astrid Centeno is doing her PhD at London South Bank University. She has a Master's degree in Drilling Engineering and is a Senior Lecturer of Petroleum Engineering at London South Bank University. She has eleven years of progressive experience within the petroleum industry, six years in the academic area with experience as Senior Lecturer in Petroleum Engineering courses. She did a research project in chemical flooding enhanced oil recovery.

centenom@lsbu.ac.uk

Notes: