

Latest Developments in Chemical Conformance Treatments

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Modern technologies in conformance control are of high value in oil field operations as they help reduce produced water and therefore operating costs. The interest in research, innovative designs and application procedures is still increasing as the high numbers of publications in this area every year indicates. This literature review was performed in the scope of the DGMK project 844 as an update of the DGMK Report 704-1. The development of new types of polymers and polymer-gels, as well as the improvement of existing formulas by combing them with nanoparticles, microorganisms, and other materials in publications since 2009 have been investigated. As important as the reduction of water production and relative increase in oil production is the reduction of the environmental impact of applied chemicals. In many countries regulatory requirements are getting more and more stringent as today's society becomes more sensible to the long-term effects of its acts on our planet. One part of the research focuses on higher resistance of agents regarding the range of pH, salinity, and temperatures for their use. Higher stability of those polymers and polymer systems is a key enabler for application in more complex reservoirs. Another part of the research targets the adherence to even more stringent environmental controls as this is fundamental for the license to operate. In this regard it is necessary to reduce harmful chemicals in the polymer solutions, or completely replace those by more environmentally friendly alternatives. A large number of projects researches the effectiveness of new biopolymers and new types of microorganisms with promising results. The presented work describes which chemicals, components and combinations are favored to improve desired effectiveness and a wider application range. Emphasized are nanoparticles, re-crosslinkable preformed particle gels (RPPG) and gels suitable for CO₂ application to address conformance control for miscible EOR treatments in reservoirs. As for the more environmentally friendly design, organic cross-linkers for gel formation and new types of microorganisms are preferred. Those current main research topics are touched upon, as well as where future trends are leaning towards.

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