

The Mechanism of Calcium Carbonate Scale Deposition Affected by Carboxymethyl Chitosan

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Abstract : Due to the extensive use of water injection for oil displacement and pressure maintenance in oil fields, many reservoirs experience the problem of scale deposition when injection water starts to break through. In most cases the scaled-up wells are caused by the formation of sulfate and carbonate scales of calcium and strontium. Due to their relative hardness and low solubility, there are limited processes available for their removal and preventive measures such as the “squeeze” inhibitor treatment have to be taken. It is, therefore, important to gain a proper understanding of the kinetics of scale formation and its detrimental effects on formation damage under both inhibited and uninhibited conditions. Recently, the production of chitosan was started in our country and in the PDVSA-Intevep laboratories was synthesized and evaluated the properties of carboxymethyl chitosan (CMQ) as chelating agent of Ca^{2+} ions in water injection. In this regard, the characterization of the biopolymer by ^{13}C - NMR, FTIR, TGA, and TM0374-2007 standard laboratory test has demonstrated the ability to remove up to 70% calcium ions in solution and shows a behavior that approaches that of commercial products.

Keywords : carboxymethyl chitosan, scale, calcium carbonate scale deposition, water injection

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