Lab Investigation of Inorganic Scale removal using chelating agents and Hydrochloric acid solutions

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Abstract

One of the most important damages to the oil and gas reservoirs, are inorganic scales resulted from precipitation of different inorganic solids with low solubility in near wellbore area. Remedial actions to remove inorganic scales depend on characteristics of these scales. Various solutions can be applied to remove scales that include injection of HCl acid and chelating-based solutions. Chelating agents have the ability to chelate and sequester many metal ions in water–based fluids. As a result, they can remove inorganic scales from wellbore and near wellbore area. Ethylenediaminetetraacetic acid (EDTA) and related salts are chelating agents that can remove inorganic scales. In this study, experimental investigations are conducted to measure the solubility of different scales in chelating agents (Na_4EDTA and iron chelating agents) and HCl acid solutions. In addition, optimum EDTA concentration is obtained. Results of this study show that sulfate scales demonstrate good solubility in Na_4EDTA, and other scales (iron scales) have good solubility in HCl solutions. Furthermore, Iron chelating-based solutions can completely dissolve iron (II) sulfate. However, calcium sulfate solubility in these solutions is very low.

Keywords: Inorganic Scales, Scale removal, Chelating agents, EDTA, Stimulation, Hydrochloric acid.

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