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Systematic and Facile Analysis of Deposits Composition: Implication on Effective Treatment of Oilfield Solid Deposits

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Abstract

Oilfield solid deposits present the major flow assurance problems in the oil and gas industry. In general, the deposits need to be accurately identified and quantified for appropriate design and successful implementation of any treatments. However, few works have been reported on the establishment of a systematic analytical procedure. This work, for the first time, presents a systematic approach that may be used to identify and quantify the composition of oilfield solid deposits, with different analytical methods been jointly used. The X-ray Diffraction and Fourier Transform Infrared Spectroscopy techniques were found very helpful in identifying the composition of the investigated oilfield solid deposit, whereas Thermogravimetric Analysis and Microwave Induced Plasma-Atomic Emission Spectroscopy were the most appropriate quantification techniques. The collected sample was found to contain mainly $CaCO_3$ and consequently, the acid treatment method that involves the use of hydrochloric acid (HCl) solution was proposed to be the most applicable and cost-effective treatment method for its remediation. The exact amount of $CaCO_3$ scale in the oilfield system, the concentration and volume of HCl solution required for the acid treatment method need to be precisely determined to ensure the effective treatment. We believe this well-established analytical procedure will be helpful and enlightening for identification and quantification of oilfield solid deposits and thus may facilitate the effective and efficient treatments on the undesirable deposits

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