

Estimation of crude oil salt content using a simple predictive tool approach

Abstract

The removal of salt from crude oil for oil-field processing has been and still is a mandatory requirement. Salt in crude oil is, in most cases, found dissolved in the remnant brine within the oil. The chemical composition of these salts varies, but the major portion is nearly always sodium chloride. This remnant water exists in the crude oil as a dispersion of very fine droplets highly emulsified in the bulk of oil. In this work, a simple predictive tool for practical correlation for salt content in crude oil as a function of brine quantity that remains in the oil, its salinity (in vol% of sodium chloride concentration) and temperature using an exponential function has been formulated. The proposed method predicts the amount of salt in the crude oil for temperatures up to 373. K and sodium chloride concentrations up to 250,000. ppm (25% by volume). Estimations from the proposed correlation are found to be in excellent agreement with the reported data in the literature with average absolute deviation being 0.3%. The tool developed in this study can be of immense practical value for the engineers to have a quick check on the salt content in the crude oil at various conditions without opting for any experimental measurements. In particular, petroleum and field engineers would find the approach to be user-friendly with transparent calculations involving no complex expressions.