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## THE EFFECT OF CHEMICAL INHIBITORS ON CRUDE OIL RHEOLOGY

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The world demand for energy has led oil companies to expand their operations in cold environments such as the offshore deepwater and onshore for more reservoirs. During hydrocarbon production in the cold environment, these oil companies are challenged with the problem of wax deposition from the crude oil building up on the pipe wall. It leads to increases in operational and remedial costs while suppressing oil production. Wax inhibitors are one of the mitigation technologies that has been examined for its influence on crude oil viscosity and wax appearance temperature (the temperature at which the first crystal of wax start to deposit from crude oil). During this work, the performance of some of wax inhibitors such as acetone, copolymer+acrylated monomers coded W804, and copolymer+acrylated monomers coded W805 was evaluated to determine their effects on the crude oil rheology, using the programmable Rheometer rig at gradient temperatures 0°C to 55 °C and shear rate 120 1/s. The synergy of using mixtures of such chemical inhibitors has been examined by adding 250, 500, 1000, 1500 and 2000 ppm of the mixtures of inhibitors to the crude oil. The first mixture includes acetone with copolymer+acrylated monomers (W804), and the second mixture includes acetone with copolymer+acrylated monomers (W805). These mixtures

works well compared with its original components. The wax appearance temperature of the used crude oil in this study without inhibitors is 30°C. The first mixture of inhibitors reduced the wax appearance temperature of oil to 25.2, 24, 18.4, 16.8, and 15.4°C, at concentration 250, 500, 1000, 1500 and 2000 ppm respectively. While, the second mixture of inhibitors reduced wax appearance temperature of the crude oil to 24.3, 21.7, 16.7, 15.3 and 14.2°C, at concentration 250, 500, 1000, 1500 and 2000 ppm respectively. This blend of the inhibitory properties and significant reduction in wax appearance temperature and oil viscosity is providing a unique contribution in wax elimination methods.

### Biography

Muhammad Ali Theyab has completed his PhD in chemical, process and energy engineering and MSc in petroleum from London South Bank University, UK and BSc chemical engineering from Tikrit University, Iraq. He is an Employer at the Iraqi Ministry of Higher Education and Scientific Research. His research interests include fluid flow assurance - wax deposition, enhanced oil recovery. He has authored several technical papers. He is a member of Society of Petroleum Engineers.

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