

# Petroleum Engineering

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## Experimental study on the effect of inhibitors on wax deposition

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Wax can precipitate as a solid phase on the pipe wall during production when its temperature drops below the Wax Appearance Temperature. Wax deposition can result in the restriction of crude oil flow, creating pressure abnormalities and causing an artificial blockage leading to a reduction in the production. A series of experiments were carried out at different flow rates (2.7, and 4.8 litre/min) to study and measure the wax thickness. The performance of some of wax inhibitors was evaluated to determine their effects on the wax appearance temperature and the viscosity of the crude oil using the programmable Rheometer rig at gradient temperatures (55 – 0°C) and shear rate 120 1/s before and after adding 1000 ppm and 2000 ppm of inhibitors to the crude oil. Three different inhibitors which were not tested before were prepared in the lab of this study. These inhibitors works efficiently compared with its original components. The first inhibitor was coded Mix01 by mixing polyacrylate polymer (C16-C22), and copolymer + acrylated monomers. The reduction of pour point of the waxy crude oil was up to a 16.6°C at 2000 ppm concentration and this reduces the crude oil viscosity to about 61.9% at a seabed temperature of 4°C. The second inhibitor was coded Mix02, by mixing polyacrylate polymer (C16-C22), alkylated phenol in heavy aromatic naphtha, and copolymer dissolved in solvent naphtha. At 2000 ppm, the reduction of pour point of the crude oil up to a 15.9°C and decreases the viscosity to 57% at a seabed temperature of 4 °C. Finally, the third inhibitor was Mix03, by mixing polyacrylate polymer (C16-C22), and brine (H<sub>2</sub>O+NaCl). At 1000 ppm concentration, the reduction of pour point of the oil was up to a 14.4 °C and reduced the viscosity to 52.5% at a seabed temperature of 4 °C. This unique blend of the inhibitory properties and significant reduction in pour point temperatures and crude oil viscosity is providing a novel progress in flow assurance technology.

### Biography

Muhammad Ali Theyab has completed his BSc in Chemical Engineering from Tikrit University/Iraq, MSc in Petroleum Engineering from London South Bank University and currently, he is a PhD student at the same university. He is an employee at Ministry of Higher Education and Scientific Research in Iraq.

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