

Ionic liquids as demulsifier formulations of heavy and extra-heavy Mexican crude oils

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Petroleum is produced as water-in-oil emulsions, which are stabilized by a wide class of natural surfactants that appear in heavy oil, such as asphaltenes. To eliminate water (down to a level of <1%) is essential forcing the coalescence of water droplets and producing their separation by settling. Current demulsification processes is achieved mostly by addition of chemical compounds [1].

Ionic liquids (IL) were synthesized and evaluated for its capability to break water-in-oil emulsions in heavy and extra-heavy Mexican crude oils using bottle test at 80°C.

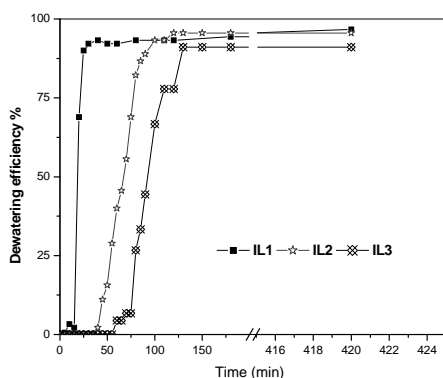


Fig. 1 Dewatering efficiency of IL demulsifiers on extra-heavy Mexican oil (API=9, water content: 30%). IL-1=Trioctylmethylammonium chloride; IL-2=Trioctylmethylammonium methylsulfate; IL-3=Trioctylmethylammonium ethylsulfate

The dewatering efficiencies of IL-1, IL-2 and IL-3 demulsifiers were 95, 96 and 94%; respectively. The IL-1 was the best because remove almost all water in just 25 minutes, whereas IL-2 and IL-3 required 120 minutes.

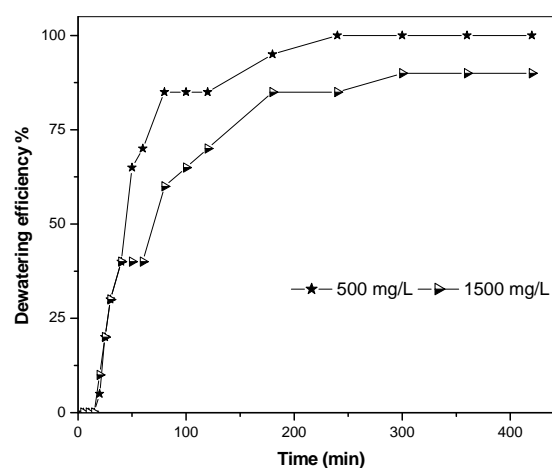


Fig. 2 Dewatering efficiencies of IL-4 demulsifier on heavy Mexican oil (API=16, water content: 10%), at different concentration. IL-4=Trihexylmethylammonium methylsulfate.

When the concentration of IL-4 demulsifier is 500 mg/L, the dewatering efficiency is 20-25% higher than 1500 mg/L.

The results have shown that IL's are promising demulsifiers, because they dehydrated efficiently heavy and extra-heavy Mexican crude oil. The efficiency is related to water content, API gravity and chemical structure of IL.

References

- [1] Rondón M., Bouriat P., Lachaise J., Salager J.L. (2006) Energy Fuels 20, 1600-1604 D.C.