Short Communication

Fast and Energy-efficient Demulsification for Crude Oil Emulsions Using Pulsed Electric Field

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The demulsification performance for crude oil emulsions using pulsed electric field with and without demulsifiers was studied to find a fast and energy-efficient way to separate oil and water. Demulsifiers with more branches is more effective in demulsification due to the increased penetrability of the demulsifiers, the dewatering rate of crude oil emulsions by AE 121 can reach up to 96.4 % after 60 min. The optimal voltage, frequency and pulse duration ratio of the pulsed electric field for the electro-demulsification process is 5 kV, 4 kHz and 0.8, respectively and a dewatering rate of 91.3 % after 10 min can be obtained at this condition. There is good synergistic effect between demulsifier and pulsed electric field for the demulsification of crude oil emulsions. The demulsification process by demulsifier and pulsed electric field can save at least 50 % demulsifier compared with the chemical demulsification while it can save 50 % time and energy compared with the pulsed electric field demulsification process.

Keywords: demulsification, crude oil emulsion, demulsifier, pulsed electric field, synergistic effect

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