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Microwave assisted demulsification of water-in-crude oil emulsions

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Emulsions occur frequently in refineries, production facilities and petrochemical plants as a result of the simultaneous presence of hydrocarbons, water and fine solids. These emulsions give rise to a variety of operating and environmental problems, many of which result in plant capacity limitation. Until now, breaking or resolving emulsions has been dealt with episodically and with considerable cost and difficulty. This research is designed to study the effect of microwave irradiation in enhancing the separation of water in crude oil emulsions. The simulated water in crude oil emulsion was used as the sample throughout the research. Parameters examined in this work were demulsifying agent dosage and microwave exposure time. At the early stage of study, the stability of simulated emulsion was determined. The suitable composition of emulsion was used for the comparison study of demulsification with and without the microwave irradiation. The study showed that the presence of microwave irradiation accelerated the separation process of water in crude oil emulsions. The degree of improvement was dependent on the dosage of demulsifying agent and the microwave exposure time. The optimum condition for the exposure time of microwave was 20 second with 2500 ppm of demulsifying agent dosage.