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## **Dynamic Behavior for Breakup of Single Water Drop and Bridging between Electrodes by Multiple Water Drops Falling through an Oil Phase under Applied Electrical Voltage**

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Dynamic behavior for breakup of a single water drop and coalescence among multiple water drops falling through an oil phase were experimentally studied in a novel electrodynamic liquid-liquid contactor, which was developed for use as a large-scale practical electrodynamic desalter for crude petroleum. (1) In the experiment of a single water drop, the effects of electric field strength on elongation rate of the drop, breakup mechanism of the drop and the number of the breakup drops were investigated. It was found that the dynamic breakup of the drop could be grouped into three types depending on the strength of the electric field. (2) In the experiment of multiple water drops, the effects of interacting range of their positions and the electric field strength on drop-drop coalescence between the main drop and surrounding drops were examined. Droplet-chains formed by multiple water drops falling between the electrodes and the resulting formation of a water bridge, which cause operational problems in desalters, were simulated experimentally, and their formation process and their shapes were traced.

**Keywords:** [Electrodynamic desalter](#), [Drop breakup](#), [Drop coalescence](#), [Electric field](#)

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