

SP3 COALESCENCE OF DISPERSED WATER DROPS IN DIESEL FUEL USING ELECTROWETTING PHENOMENA

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Electrowetting phenomenon was shown to enhance coalescence of dispersed water drops in radial flow between two circular electrodes. The Electrowet-Coalescer (EWC) device was effective for enlarging drops from average size of about 20 μm to 120 μm . The EWC is useful as a pre-coalescer to enhance the performance of filters and other separators to remove water from the fuel. Power consumption was very low.

Electrowetting causes drops to spread on electrode surfaces. When drops spread on surfaces they resist movement due to fluid drag. The resistance to drag effectively causes drops to concentrate and the probability for their coalescence increases. This paper discusses the principles of electrowetting and the effects of electrowetting on droplet shapes. Parameters controlling electrowet-coalescence are discussed and consideration given to EWC design.