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Particle size and zeta potential changes in the disperse phase of water-emulsified waste waters in different treatment stages

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Abstract

© 2015 Springer Science+Business Media New York. We have studied the colloidal properties of stable highly disperse emulsions: fresh and waste lubricant/liquid coolant (LLC) and water-emulsified waste waters. The fresh LLC is monodisperse and the particle size of the disperse phase is equal to 0.086 μm . The particle size for the disperse phase of the waste LLC is 0.05-0.15 μm . We have identified the trends in the variation in colloidal properties of the waste LLC during treatment in different stages: coalescence treatment, sorption of petroleum products by a composite sorbent, ultrafiltration, nanofiltration, final purification on an ion-exchange membrane. After the membrane treatment methods, the average particle size increases and the absolute value of the zeta potential decreases due to breaking of the emulsion; the particles instantaneously become larger due to loss of charge while passing through the pores of the membranes.

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Keywords

Emulsion, Lubricant/liquid coolant, Membrane, Waste waters, Zeta potential