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ABSTRACT

The Development, Optimization and Characterization of Trinidad Lake Asphalt Emulsions

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Current methods of working with Trinidad lake asphalt (TLA) involve the use of heat application or organic solvents, both of which have harmful environmental impacts. An attractive alternative in making TLA more easily workable and at the same time addressing many environmental concerns is by emulsification.

In this thesis a method for the emulsification of TLA is developed utilizing surfactants from the three main surfactant groups. The key role of sodium hydroxide (NaOH) in the emulsification process has been elucidated, resulting in a proposed mechanism for emulsification. This mechanism involves the disruption of the dimerized structures of the TLA allowing the surfactant to penetrate the bitumen component and promote emulsification.

A novel method for the stabilization of the resulting TLA emulsion has been developed involving the formation of a cross-linked structure in the emulsion by treatment with electrolyte (calcium chloride) solution. This stabilization significantly increases the shelf life of the emulsion.

Keywords: Clifton Balkaran; Trinidad Lake Asphalt (TLA); Emulsions