

## Nanoemulsion Phase Transition Temperatures in $C_{23}H_{48}$ and $C_{28}H_{58}$ Mixture Via Light Scattering

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The use of paraffin waxes and liquids arouses interest, among others, in the industries of paper, food, cosmetics, household chemicals, oil and gas, and in general energy. It deserves a special mention their use as phase change materials. Static and Dynamic Light Scattering (SLS and DLS), are techniques commonly adopted to measure the size of emulsions and suspensions as well as the polymer molecular weight in a solution. We propose the use of a light scattering method to obtain information about the dynamics and the thermodynamics of n-alkane nanoemulsions. In particular, we prepared a nanoemulsion of a paraffin mixture ( $C_{23}H_{48}$  and  $C_{28}H_{58}$ ) in water without surfactants, with different component concentration ratios, by means of ultrasonic dispersion following the detailed procedure described in the text. We investigate the samples' temperature dependence via SLS at heating and cooling. We present the range determination of the phase transition temperatures as a function of the component concentrations: the melting temperature shows a linear dependence on the component concentration; meanwhile the solid-rotator phase transition has a nonmonotonic behavior with a minimum close to 60 % in weight of the  $C_{23}H_{48}$  in the mixture. In this work we explored the possibilities to obtain information about the phase transitions and their kinetics via SLS measurements, with a method applicable to a wide class of mixtures that can be useful to compare and integrate data obtained by other techniques.