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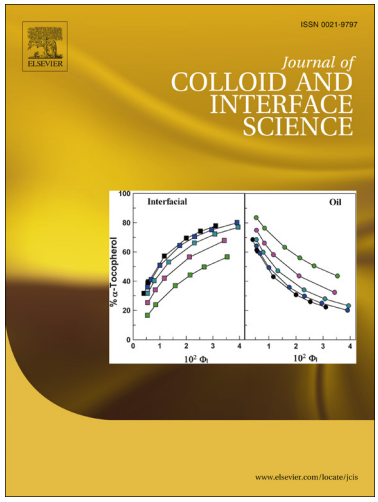


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# Activation energy and entropy for viscosity of wormlike micelle solutions

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**Abstract**

The viscosities of two surfactant solutions which form wormlike micelles (WLMs) were studied over a range of temperatures and strain rates. WLM solutions appear to differ from many other shear thinning systems in that, as the shear rate increases, stress – shear rate curves tend to converge with temperature rather than diverge and this can sometimes lead to higher temperature curves crossing those at lower. Behaviour was analysed in terms of activation kinetics. It is suggested that two mechanisms are involved: Newtonian flow, following an Arrhenius law superimposed on a non-Newtonian flow described by a stress assisted kinetic law, this being a more general form of the Arrhenius law. Anomalous flow is introduced into the kinetic equation via a stress dependent activation entropy term.

Keywords: wormlike micelles, shear thinning, activation energy, activation entropy