

Abstract Submitted
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Irreversible Flow-Induced Structure Transition in Rodlike Micelle Solutions¹ M. VASUDEVAN, E. BUSE, D. LU, A. SHEN, B. KHOMAMI, R. SURESHKUMAR — It is well known that translucent solutions containing rod-like surfactant micelles can form flow-induced structures. To date all reported FIS transitions are reversible, i.e., the gel disintegrates after flow stoppage. We show that in microfluidic devices that allow for the generation of extension rates much greater than those realized in conventional rheometers, irreversible FIS transitions can occur. Cryo-TEM analysis of the gel reveals a partially aligned micelle network. The critical flow rate for gel formation is consistent with a mechanism based on the fusion by collision of flow-aligned micelles proposed by Turner and Cates (J. Phys: Condens. Matter, 4, 3719 (1992)).

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