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Modeling Shear Thickening In Dilute Polymer Solutions

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Modeling Shear Thickening In Dilute shear thickening in a dilute polymer solution at a steady state. This

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experimental behavior of shear thickening was observed by Layec-Raphalen and Wolff¹² and Vraholpoulou and McHugh.¹³ The usual pattern of shear-thinning behavior is evident at low to intermediate shear rates. The viscosity reaches a local minimum with increasing shear rate at $\dot{\gamma}_c$, and then

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Modeling Shear Thickening in Dilute Polymer Solutions ...

The Two Coupled Maxwell Modes (TCMM) Model is applied to give quantitative descriptions of shear-thickening behavior, which can be observed under certain conditions for high molecular weight polymers dissolved in low viscosity solvents.

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Modeling shear thickening in dilute polymer solutions ...

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dissolved in low viscosity solvents.

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high molecular weight...

Modeling shear thickening in dilute polymer solutions ...

Brownian dynamics simulations of shear-thickening in dilute polymer solutions. Rheologica Acta 1996, 35 (3) , 274-287. DOI: 10.1007/BF00366914. B.H.A.A van den Brule, P.J Hoogerbrugge. Brownian

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Dynamics simulation of reversible polymeric networks.

Models of shear-thickening behavior in physically ...

In the shear thickening region, the model predicts either a reentrant zone, which is caused by multi-valued shear stresses when the data are collected

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with a shear stress-controlled mode or a continuous increase in the shear stress-shear rate flow curve, when the data are collected with a shear rate-controlled mode; in this region, two coexisting phases are predicted.

On the modelling of the shear thickening behavior in ...

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However, the proposed models, called f-Giesekus and f-FENE-P models, can predict the shear-thickening properties. The developed models are inspired by the Bautista-Manero-Puig model, where the Oldroyd-B model (upper-convected Maxwell model) is coupled with the fluidity equation. Parametric studies prove that the proposed models can

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accurately predict both the shear-thickening and shear-thinning properties.

Rheological modeling of both shear-thickening and thinning ...

The counterion typically has a hydrophobic moiety and acts like a co-surfactant. – The shear thickening

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transition is observed in the dilute regime, where the rodlike micelles are not entangled [8,11].

Shear thickening in dilute solutions of wormlike micelles

Abstract A versatile model describing the shear thickening behaviour of dilute polymer solutions in high shear flows is

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presented. The polymer macromolecules are modelled as Hookean elastic dumb-...

Brownian dynamics simulations of shear-thickening in ...

As the constitutive equation model to predict the shear-thickening behavior is a typical feature of dilute surfactant

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solutions with drag-reducing ability, Bautista et al. proposed the Bautista–Manero–Puig (BMP) model.

Rheological modeling of both shear-thickening and thinning ...

The nonlinear transient extensional and steady-state shear rheological properties of dilute polystyrene solutions of

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molecular weight 3.9 and 10.2 million in a theta solvent are predicted using Brownian dynamics (BD) simulations with the bead-spring model. Full hydrodynamic interaction is incorporated into BD simulations using the Rotne-Prager tensor.

Modeling hydrodynamic interaction

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in Brownian dynamics ...

Abstract A versatile model describing the shear thickening behaviour of dilute polymer solutions in high shear flows is presented. The polymer macromolecules are modelled as Hookean elastic dumbbells which deform affinely during flow. In addition, the dumbbells feel a retractive anisotropic hydrodynamic

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drag and an isotropic Brownian force.

Brownian dynamics simulations of shear-thickening in ...

Discontinuous shear thickening in confined dilute carbon nanotube suspensions Sayantan Majumdera, Rema Krishnaswamyb, and A. K. Sooda,b,1
aDepartment of Physics, Indian Institute

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of Science, Bangalore 560012, India; and
Jawaharlal Nehru Centre for Advanced
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Bangalore 560064, India Edited* by C. N.
R. Rao, Jawaharlal Nehru Centre for
Advanced Scientific ...

**Discontinuous shear thickening in
confined dilute carbon ...**

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Dilute solutions of worm-like micelles exhibit shear thickening caused by microstructural changes under specific flow conditions. In this work, for the first time, shear thickening in parallel plate and Poiseuille flows is investigated using simultaneously particle image velocimetry (PIV) and rheometry.

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On the shear thickening flow of dilute CTAT worm-like ...

Home > Journal of the Physical Society of Japan > Volume 89, Number 8 > Two-Step Discontinuous Shear Thickening of Dilute Inertial Suspensions... J. Phys. Soc. Jpn. 89, 084803 (2020) [9 Pages]

Two-Step Discontinuous Shear

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Thickening of Dilute Inertial ...

In the context of the measured rheology and theoretical models, this liquid-like behaviour occurs at low pressure or when the suspension is dilute enough that only weak (continuous) shear...

Flow-to-fracture transition and pattern formation in a ...

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Shear thickening in dense suspensions can also arise from dilation effects (33), which manifests as a sharp increase by a few orders of magnitude in the normal stress (3) at the onset of ST. In comparison, the normal stress does not increase sharply at the onset of ST (see SI Appendix, Text S5 and Fig. S5).

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Discontinuous shear thickening in confined dilute carbon ...

A dilatant (/ daɪˈleɪtənt /, / dɪ -/) (also termed shear thickening) material is one in which viscosity increases with the rate of shear strain. Such a shear thickening fluid, also known by the initialism STF, is an example of a non-Newtonian fluid. This behaviour is usually not observed in

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pure materials, but can occur in suspensions.

Dilatant - Wikipedia

Many dilute wormlike micelle solutions (WMS) exhibit the formation of flow-induced structure (FIS), which is accompanied by both birefringence and substantial shear-thickening. Despite the

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increasingly frequent use of wormlike micelle solutions, the phenomena of FIS still remain poorly understood at a fundamental level, and mathematical models that capture FIS and allow prediction of fluid dynamical behavior are lacking.

Rheology and fluid dynamics of

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dilute surfactant solutions ...

Shear-thickening A strange material may make protective helmets more so. It absorbs impact energy more effectively. ... with newer models being rated for just over four.

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