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Simplified tube models for entangled supramolecular polymers[1]
VICTOR BOUDARA, DANIEL READ, University of Leeds — This presentation describes current efforts investigating non-linear rheology of entangled, supramolecular polymeric materials. We describe two recently developed models: 1) We have developed a simplified model for the rheology of entangled telechelic star polymers. This is based on a pre-averaged orientation tensor, a stretch equation, and stretch-dependant probability of detachment of the sticker. In both linear and non-linear regimes, we produce maps of the whole parameter space, indicating the parameter values for which qualitative changes in response to flow are predicted. Results in the linear rheology regime are consistent with previous more detailed models (van Ruymbeke et al. Macromolecules, 43, 4401-4411, 2010) and are in qualitative agreement with experimental data. 2) Using the same modelling framework, we investigate entangled linear polymers with stickers along the backbone. We use a set of coupled equations to describe the stretch between each stickers, and use equations similar to our star model for attachment/detachment of the sticky groups. This model is applicable to industrial polymers such as entangled thermoplastic elasomers, or functionalised model linear polymers.

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Daniel Read
University of Leeds

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