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Macromolecular Architecture and Complex Viscosity ALAN JEFFREY GIACOMIN, MONA KANSO, CHAIMONGKOL SAENGOW, JOURDAIN PIETTE, Queen's University — General rigid bead-rod theory [Hassager, *J Chem Phys*, **60**, 4001 (1974)] explains polymer viscoelasticity from macromolecular orientation. By means of general rigid bead-rod theory, we relate the complex viscosity of polymeric liquids to the architecture of axisymmetric macromolecules. In this work, we explore the zero-shear and complex viscosities of 24 different axisymmetric polymer configurations. When non-dimensionalized with the zero-shear viscosity, the complex viscosity depends on the dimensionless frequency and the sole dimensionless architectural parameter, the *macromolecular lopsidedness*. In this work, in this way, we compare and contrast the elastic and viscous components of the complex viscosities of macromolecular chains that are straight, branched, ringed, or star-branched. We explore the effects of branch position along a straight chain, branched-chain backbone length, branched-chain branch-functionality, branch spacing along a straight chain (including pom-poms), the number of branches along a straight chain, ringed polymer perimeter, branch-functionality in planar stars, and branch dimensionality.

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