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Molecular Weight Dependence of the Viscosity of Polyethylene Macrocycles JIAN WANG, Texas Tech University, GREGORY MCKENNA, Texas Tech University, DIEGO BENITEZ, California Institute of Technology, IRINA GORODETSKAYA, California Institute of Technology, ROBERT GRUBBS, California Institute of Technology — The Grubbs group at Caltech is using a new method of synthesis for the production of macrocycles that avoids the problems of sample contamination with long chain linear molecules. They have produced macrocyclic polyethylenes having molecular weights as high as 400,000 g/mole. At Texas Tech University rheological measurements are being made using both the Plazek Magnetic Bearing Torsional Creep Apparatus and a Paar Physica controlled stress rheometer. Because the samples are polydisperse, with M_w/M_n values of 1.6-1-9, we here report only the results of the viscosity as a function of molecular weight. Surprisingly, unlike reports in the literature for polystyrene rings or polybutadiene rings, the viscosities of the polyethylene rings are larger than those for equivalent molecular weight linear polyethylenes and the viscosity increases approximately exponentially with weight average molecular weight. Further results will be reported at the meeting.

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