Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Shear-Induced Shish-Kebab Morphology in Polymer Melts - Flow Between Two Parallel Plates versus Coaxial Cylinders RAJESH SOMANI, IGORS SICS, BENJAMIN HSIAO, Department of Chemistry, State University of New York, Stony Brook, NY 11794 - 3400 — *In-situ* synchrotron SAXS (small-angle X-ray scattering) studies of shear-induced shish-kebab morphology in isotactic polyprolylene melt under two different flow geometries have been carried out. These geometries included (1) shear between two parallel-plates, where the X-ray beam was perpendicular to the flow and neutral directions, and (2) shear between coaxial cylinders or couette flow, where the X-ray beam was perpendicular to the flow and gradient directions. Time-resolved SAXS patterns revealed the formation of typical shish-kebab morphology under both flow geometries; whereby equatorial streaks due to shish were seen to evolve immediately after shear, followed by meridional maxima due to kebabs. SAXS images obtained under the parallel-plate and couette flow geometries exhibited a striking resemblance indicating the cylindrical symmetry of the shish-kebabs and similar spatial distribution along the orthogonal directions in sheared melts. The high temperature stability of iPP shish-kebabs and its molecular origin will be discussed. The financial support of this work was provided by NSF (DMR-0405432).

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Date submitted: 01 Dec 2004 Electronic form version 1.4