Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Topology of Branched Polymers: Effect on Structure and Dynamic Properties[1] RAMNATH RAMACHANDRAN, GREGORY BEAUCAGE, AMIT S. KULKARNI, University of Cincinnati, VASSILIOS GALIATSATOS, DOUGLAS C. MCFADDIN, LyondellBasell Industries — We investigated linear and branched polyethylene (PE) using small-angle neutron scattering (SANS). The experiments were conducted on dilute solutions of PE in deuterated p-xylene. A variety of structural information[†] such as fractal dimension (d_f), connectivity dimension (c), minimum path dimension (d_{min}), long chain branch fraction (ϕ_{br}), radius of gyration (R_g) and persistence length (l_p) were obtained. Such information presents a qualitative and quantitative assessment of branching in polymers. Theoretical models such as 'binary contacts per pervaded volume' model[*] were employed to correlate the structural information of the polymer to its entanglement molecular weight (M_e). M_e was used to predict physical properties of the polymer such as plateau modulus (G_N^0) and zero-shear viscosity (η_0). [†]Beaucage G. *Physical Review E* **70**,031401 (2004) [*]Colby *et al. Macromolecules* **25,** p.996 (1992)

[1]Work was supported by LyondellBasell Industries. Results shown in this report are derived from work performed at Argonne National Laboratory. Argonne is operated by UChicago Argonne, LLC, for the U.S. Department of Energy under contract DE-AC02-06CH11357

Ramnath Ramachandran
University of Cincinnati

Date submitted: 27 Nov 2007 Electronic form version 1.4