Abstract Submitted
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Relating Chain Structure to Physical Properties of Branched Polymers[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 such as plateau modulus (G_N^0) and zero-shear viscosity (η_0). We relate physical properties of branched polymers to their structural properties.[†]Beaucage G. *Physical Review E* **70**,031401 (2004) [*]Colby *et al. Macromolecules* **25,** p.996 (1992)

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