

Abstract Submitted  
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**Oriented Lamellar Structure and Pore Formation Mechanism in CSX-Processed Porous High-Density Polyethylene** SHUJUN CHEN, SAMUEL P. GIDO, Dept. of Polymer Sci. and Eng., Univ. of Massachusetts, Amherst, MA 01003, SOUVIK NANDI, H. HENNING WINTER, Dept. of Chem. Eng., Univ. of Massachusetts, Amherst, MA 01003 — Characterization of pore structure and pore wall crystal structure was performed on porous high-density polyethylene (HDPE) using SEM, TEM, and electron diffraction. The porous HDPE material was obtained through crystallization from swollen crosslinked polyethylene gels (CSX process) in supercritical propane. SEM showed an open pore structure of micron-sized pores, large void fraction and surface area, as well as thin yet rigid pore walls, making this material a good candidate for a variety of applications. TEM revealed oriented lamellar structure in the pore walls which was much different from structures found in typical bulk HDPE as well as that of the crosslinked HDPE before CSX processing. Electron diffraction results confirmed the presence of oriented lamellar stacking. Based on this oriented lamellar structure, possible mechanisms for crystallization and pore formation in the CSX process are suggested.

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