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Time-resolved WAXD/SAXS Characterization on the Crystallization of Silica Filled HDPE Nanocomposite[1] XIAOWEI LI, CHRISTIAN BURGER, YIMIN MAO, BENJAMIN HSIAO, Stony Brook University — The isothermal crystallization behavior of high density polyethylene/silica (HDPE-SiO2) with different SiO2 loading of 2% and 5%, along with the pure HDPE sample was studied by using the time-resolved wide angle X-ray diffraction (WAXD) and small angle X-ray scattering (SAXS) techniques. For isothermal crystallization at 120 °C, WAXD profiles show HDPE-Si2% has the highest ending crystallinity index, while HDPE-Si5% has the lowest value. Avrami exponent of pure HDPE is about 3.9, while HDPE-Si2% has a value of 3.2 which is typically heterogeneous nucleation behavior due to the addition of silica in HDPE. SAXS patterns show that the silica inside HDPE has mass fractal structure. The mass fractal dimension is determined by using the fitting method and the value is less than 3 for all HDPE-SiO2 samples. The structure of HDPE-SiO2 is sketched based on the obtained results.

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