Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Effect of OMS on Crystal Phases of PVDF Crystallized From the Melt B.S. INCE-GUNDUZ, R. ALPERN, D. AMARE, K. BURKE, P. CEBE, J. CRAWFORD, B. DOLAN, S. JONES, R. KOBYLARZ, M. KOPLITZ, M. MELESKI, M. REVELEY, A. SAGIV, Tufts University — Addition of extremely small amounts of organically modified silicate (OMS) into poly(vinylidene fluoride) (PVDF) causes the polar beta phase to form preferentially in quenched or cold-crystallized samples. Here, we report on further studies of PVDF/OMS nanocomposites crystallized from the melt. Nanocomposite samples were prepared with 0-4wt.% OMS, and crystallized from melt at 150°C for an hour or at 165°C for 16 hrs. In neat PVDF, these treatments favor the growth of non-polar alpha and polar gamma crystal phases, respectively. SAXS and WAXS, FTIR, and DSC were used to establish the crystal phase. Morphology was studied using POM and AFM. For samples crystallized at 150°C, formation of beta-PVDF can be seen in nanocomposites even at 0.01wt.% of OMS, and the ratio of beta phase to alpha phase increases as the OMS content increases. POM reveals that highly birefringent alpha spherulites occur together with less birefringent spherulites. FTIR microscopy shows these weakly birefringent spherulites are in beta phase. For samples crystallized at 165°C, alpha and gamma phases occur together, and the gamma fraction increases with the addition of OMS. Research supported by: NSF-DMR Polymers Program, grant DMR-0406127.

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Date submitted: 16 Nov 2006 Electronic form version 1.4