Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Dielectric Relaxation of PVDF/STN Nanocomposites[1] LEI YU, PEGGY CEBE — Dielectric relaxation behavior of poly(vinylidene fluoride), PVDF, with Lucentite^{TM} STN nanoclay was investigated over the frequency range from 20 Hz to 1MHz. Lucentite^{TM} STN synthetic nanoclay is based on hectrite structure with an organic modifier contained between the hectrite layers. Composition of the PVDF/STN nanocomposites ranged from 0%-10% STN by weight. Wide angle X-ray and Fourier transform infrared spectroscopy results are consistent with the conclusion that pure alpha phase is formed in PVDF film while STN 1% sample contained majority beta phase, and a tiny amount of alpha phase. When the STN content increased to 5% and 10% only the beta phase was observed. The α_a (glass transition) and α_c (crystalline) relaxation rates were plotted against the reciprocal of temperature, respectively. The dielectric result shows that the relaxation rate of the α_a relaxation, related to the motions of amorphous polymer chains, is increased by the addition of STN. However, the activation energy for the α_c relaxation, related to motions of the crystalline chains, remained unchanged with STN addition. A mechanism is proposed to interpret the relative position and interaction between PVDF chains and STN

[1]Research supported by the National Science Foundation, Polymers Program of the Division of Materials Research grant DMR-0602473.

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Date submitted: 19 Nov 2008 Electronic form version 1.4