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**Differential Scanning Calorimetry Investigations on Polyvinylidene Fluoride – $Fe_3O_4$ Nanocomposites** SAMANTHA SALINAS, ROBERT JONES, DORINA M. CHIPARA, MIRCEA CHIPARA, The University of Texas Pan American — Nanocomposites of polyvinylidene fluoride (PVDF)–magnetite ($Fe_3O_4$) with various weight fractions of nanofiller (0%, 0.2 %, 0.6 %, 1.2%, 2.4 %, 5.8 %, 12 %, 23 %, and 30 % ) have been obtained via melt mixing by loading PVDF with $Fe_3O_4$ particles (average size 75 nm from Nanostructured & Amorphous Materials, Inc). Thermal stability of PVDF-$Fe_3O_4$ has been investigated by TGA in nitrogen. The increase of the thermal stability of PVDF due to the loading with $Fe_3O_4$ was quantified by the shift of the temperature at which the (mass) degradation rate is maximum as a function of $Fe_3O_4$ content. The effect of the nanofiller on the crystallization of PVDF was investigated by isothermal DSC (TA Instruments, Q500). Non isothermal DSC tests, (at various heating rates ranging from 1 to 25 °C/min) have been used to locate the glass, crystallization, and melting temperatures. The dependence of the glass, crystallization, and melting temperatures on the concentration of nanoparticles is reported and analyzed in detail. The data are critically analyzed within the classical Avrami theory.

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