Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electrical properties of isotactic polypropylene loaded with carbon nanofibers MIRCEA CHIPARA, The University of Texas Pan American, MAGDALENA L. CIUREA, National Institute of Materials Physics, Romania, KAREN LOZANO, The University of Texas Pan American, GHEORGHE V. ALDICA, National Institute of Materials Physics, Romania, DORINA M. CHIPARA, The University of Texas Pan American, STELIAN POPA, IONEL STAVARACHE, National Institute of Materials Physics, Romania — Nanocomposites have been obtained by dispersing vapor grown carbon nanofibers (VGCNF) within isotactic polypropylene (iPP) via melt mixing. VGCNFs were purified and disentangled before blending with iPP. The mixing was performed by using HAAKE Rheomix, at 180 ^{o}C and 65 rpm for 9 minutes followed by an additional mixing at 90 rpm for 5 minutes (same temperature). The electrical properties of nanocomposites loaded with various amounts of VGCNFs (0%, 1%, 2.5%, 5%, 7.5%, 10%, 15%, and 20% wt.) have been investigated. DC electrical measurements revealed a percolation threshold at about 12 % wt. VGCNFs. The DC electrical characteristics of the nanocomposites located above the percolation threshold were investigated in detail, in a wide temperature range starting from 20 K up to about 750 K. The investigations revealed small changes of the DC conductivity within the glass and melting transition range of the polymeric matrix. The dominant charge transport mechanism below the glass transition temperature as well as between the glass and melting transition temperature is the variable range hopping. Above the melting temperature an Arrhenius like dependence of the DC conductivity was noticed.

Mircea Chipara
The University of Texas Pan American

Date submitted: 14 Dec 2012 Electronic form version 1.4