



Polymer- Based Nanocomposites

Dr. Mircea Chipara

The University of Texas Pan American

The talk will focus on materials obtained by dispersing various types of nanoparticles, with different functionalities (such as electrical conductivity, thermal conductivity, magnetic characteristic, ferroelectric features, piezoelectric capabilities, and thermoelectric) within polymeric matrices. The effect of the nanometer-sized filler on the physical properties of polymeric matrices will be shortly reviewed. Some particular type of polymer-based nanocomposite such as polymer- carbon nanostructures, polymer – magnetic nanoparticles, and ferroic polymer-based nanocomposites will be briefly analyzed.

The talk will include a brief discussion of self-assembly capabilities (for polymer blends and block copolymers) and will provide hints for potential self-assembled polymer-based nanocomposites for photonic applications.

Experimental data obtained by using mechanical tests, thermal investigations (thermogravimetric analysis and differential scanning calorimetry), electrical measurements, magnetic measurements, and spectroscopic data (X-Ray Diffraction, UV-Visible, Raman spectroscopy, and electron spin resonance) will be discussed.

The capabilities of Electron Spin Resonance Spectroscopy in the study of polymer-based nanocomposites and in particular of magnetic and ferroic polymer-based nanocomposites will be reviewed. The talk will include a primer on electron spin resonance spectroscopy will be included.

Polymer based nanocomposites are expected to present enhanced or new physical properties, together with multifunctional features, smart capabilities, and eventually self-healing properties. Such lightweight materials have a particular relevance for transportation (including space exploration). Potential applications of future polymer-based nanocomposites materials, will be succinctly presented.

Tuesday, August 4, 2009

201 Brace Lab

1:30 p.m.

Host: Prof. Andrei Sokolov

