Department of Mathematical Sciences
Department of Physics
The University of Texas at El Paso

Colloquium

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Relationship between the structure and the physical properties in cured blends of Natural rubber and Styrene-Butadiene rubber

The main advantage of producing elastomeric compounds from a mixture of two or more pure elastomers is the possibility of producing a new material, sometimes with a lower cost, and combining the properties of the main polymers without resort to a new synthesis process.

Natural rubber (NR) and styrene butadiene rubber (SBR) are ones of the most popular elastomers used in many technological applications nowadays. In the cured state they can be used alone or in blends and, in this last case, the main objective is to improve the physical properties for specific technological uses. Blend of NR/SBR, mixed with carbon black or others reinforcing material, are normally used in technological applications, mainly in the tire industry. Among the binary elastomer blends, this kind of blend belongs to the class of immiscible blends in which two phases are detected, each one corresponding to each elastomer.

In the last years we have been working in the microstructural characterization of NR/SBR blends and in the study of the influence of the structure in the mechanical, thermal and transport properties of these compounds. These works were performed within the collaboration of several research groups of Argentina and other countries.

Blends of NR/SBR, with different content of NR and SBR, were prepared using different mixing techniques (mechanical mixing and solution mixing) and using a chemical cure system based on sulfur and accelerator. Laboratory samples were cured at 160^oC and 170^oC that are temperatures normally used in technological processes. The samples were characterized by mean of different technique as differential scanning calorimetric (DSC), positron annihilation spectroscopy (PALS), transmission microscopy analysis (TEM), swelling tests in solvent, dynamic mechanical spectroscopy (DMA) and rheometric tests. During this presentation advances of this research to relate several physical properties with the blend structure are presented.

For further information, please contact Dr. Emil Schwab, eschwab@utep.edu
Refreshments will be served in front of the colloquium room,
15 minutes before the start of the colloquium.