Polymer Nanocomposites

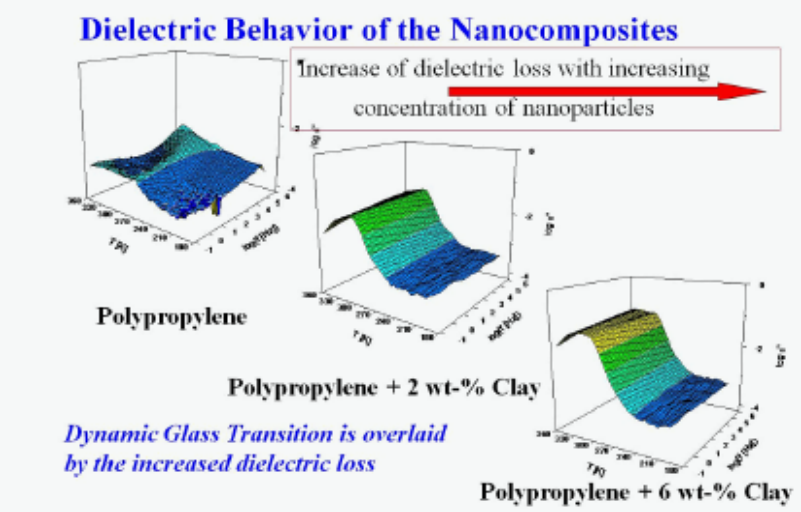
Technical Work Area 33

VAMAS

Call for Participation

Project 2

Electrical Characteristics of Polymer Nanocomposites



Objectives

The main objective of this project is the electrical and dielectric characterization of polymer nanocomposites such as their dielectric spectra, AC and DC breakdown strength, dielectric permittivity and the space charge quantity.

Background

Insulating materials constitute an essential part of any electrical equipment. Better insulation leads to the use of higher working stresses, reduction of equipment size and achievement of higher operational reliability.

Recent developments have shown that incorporating of dispersed clay nano-sized platelets into polymer matrices improve its mechanical and electrical properties. Before adoption of these nanocomposites by the electrical power industry, its properties must be well characterized and the influence of certain operating conditions understood. Certain properties would be more important in one application than in others. For example, in the development of new insulation for high voltage DC cables the evolution of space charge and its dissipation with time would be much more critical than in the insulation for AC cables.

This project will concentrate initially on a relatively small number of selected measurement techniques to determine which dielectric properties are most sensitive to the presence and concentration of various types of nano-sized fillers and to the effects on electrical ageing.

Work Programme

Measurement techniques to be used in the interlaboratory exercise:

- Dielectric spectra and loss factor in a broad frequency range
- Thermal Step Method (TSM) and/or Pulsed Electro Acoustic (PEA) technique for space charge distribution measurements
- DC Polarization/Depolarization Current measurements.
- AC ramp voltage breakdown tests.

Other techniques may also be considered based on the initial results.

Deliverables and Dissemination

- Test methods to determine the dielectric characteristics of PNCs,
- VAMAS Technical Report,
- TTA on dielectric measurements
- Publications in scientific journals,
- Development of draft text for submission to international standards development organizations.

Funding

Participation is based on in-kind contributions from the partners.

Status

Interlaboratory trials currently in progress. Call for additional participants.

For more information on participation, please contact:

Prof. Dr. Andreas SCHÖNHALS
Chair, VAMAS TWA 33
BAM Federal Institute for Materials Research and Testing, Germany
Email: **Andreas.Schoenhals@bam.de**

Prof. Dr. Carlos A. ACHETE,
Instituto Nacional de Metrologia, Normalização e Qualidade Industrial – **INMETRO**, Brasil
Email: **caachete@inmetro.gov.br**

www.vamas.org

March 2012