

Nanocomposites and nanomaterials

Thermostable nanomaterials for aerospace applications

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Cyanate Ester Resins (CER) are a promising class of reactive monomers/oligomers for the *in situ* synthesis of thermostable polymer nanocomposites filled by two-dimensional nanofillers such as multiwalled carbon nanotubes (MWCNT) or montmorillonite (MMT), as well as by tree-dimensional nanofiller such as polyhedral oligomeric silsesquioxanes (POSS). The above mentioned nanocomposites can be useful for commercial applications in the aerospace field as thermostable adhesives and dielectric matrices as well as for protecting integrated circuits from anti-static shock, *etc.*

In this work several series' of CER/MWCNTs, CER/POSS, SER/MMT nanocomposites were synthesized by *in situ* method and investigated using different techniques (X-ray, DMTA, DSC, SEM, TEM, TGA, *etc.*), and a significant effect of the nanofillers on complex of thermal, physical and chemical properties of the nanocomposites have been found. It has been established that the nanocomposites studied, especially, containing ultra-low amounts ($\ll 1$ wt. %) of specifically functionalized nanofillers possess essentially improved stability to thermal-oxidative destruction, tensile strength values, viscoelastic, thermal and other properties. This effect is explained by homogeneous distribution of small amounts of nanoparticles due to their chemical incorporation into the CER matrix.