PREPARATION AND CHARACTERIZATION OF EPOX-SILICA HYBRIDS: NONAQUEOUS SOL-GEL PROCESS

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**Abstract**

Non-aqueous synthesis of nanosilica in the epoxy resin based on diglycidyl ether of bisphenol A (DGEBA) has been successfully achieved. Organic-inorganic hybrids with silica nanostructures have been prepared and studied. Lewis acid salt of boron trifluoride monoethyl amine (BF3MEA) was proved to be an effective catalyst for the formation of nanosilica in epoxy-resin under nonaqueous conditions of the sol-gel process. Epoxy resins were cured with different amines including oligomeric diamines (Jeffamines), aromatic diamine dianidophenylmethane (DDM) and cycloaliphatic 3,3'-dimethyl-4,4'-diaminocyclohexylmethane (Laromin C260). In addition, the coupling agent glycidyloxypropyltrimethoxysilane (GTMS) was incorporated in the network to strengthen the interfacial interaction. Storage modulus of the hybrids rises with increasing content of coupling agent and this reinforcement effect is strongly dependent on the presence of BF3MEA.

**Keywords**: The structure, evolution, morphology and mechanical properties were followed by SAXS, NMR, TEM and DMA

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