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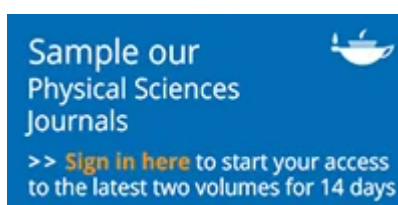
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Articles

Hybrid benzoxazines from natural bio-phenolics for enhanced thermal stability and hydrophobicity: a study on vermiculite reinforced composites with low dielectric constant

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Abstract

Two series of unsymmetrical hybrid benzoxazines were separately synthesized using combinations of natural bio-phenolic materials, namely cardanol (C) with eugenol (E), vanillin (V), and guaiacol (G) using diaminodiphenylmethane (ddm)/diaminodiphenyl ether (dde) through the well-known Mannich reaction. The synthesized hybrid benzoxazines have a cure temperature between 229 °C and 269 °C. Compared to

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v), have a lower cure temperature. TGA results show that poly(C-ddm-V) and poly(C-dde-V), two hybrid polybenzoxazines, have superior thermal stability than the other hybrid polybenzoxazines. In order to develop polybenzoxazine composites, different wt% of GPTMS functionalized vermiculite was incorporated with poly(C-ddm-V). The properties of these composites were examined and contrasted with those of a neat matrix. The hybrid polybenzoxazines and composites water contact angle values vary from 136° to 144°, suggesting that all of the hybrid polybenzoxazines and composites have good hydrophobic behavior. On increasing the concentration of vermiculite, the dielectric constant value significantly decreased to a low dielectric constant.

Q Keywords: [Bio-phenols](#) [unsymmetrical hybrid benzoxazines](#) [vermiculite reinforcement](#) [dielectric hydrophobic behavior](#)

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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