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RESEARCH ARTICLE

Boron doped graphitic carbon nitride (BN-g-C_3N_4) and palm flower ash reinforced pyrimidinone core-based polybenzoxazine composites for low-k and high-k applications

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Abstract

The present work provides a facile process route fo
pyrimidinone-based benzoxazines by using stoichio
pyrimidinone bisphenol (PBU) and paraformaldehyd
separately reacted with various types of amines und
experimental conditions. The molecular structure, curing characteristics, thermostability, hydrophobic behavior, and dielectric properties were analyzed using appropriate analytical methods. The polymerization temperature (T_p) of monomers such as PBU-oda, PBU-cha, PBU-ffa, PBU-a, and PBU-fa was determined by differential scanning calorimetry (DSC),

poly(PBU-cha), poly(PBU-ffa), poly(PBU-a), and poly(PBU-fa) were analyzed using thermogravimetric analysis (TGA). The water interface angle values for poly(PBU-oda), poly(PBU-cha), poly(PBU-ffa), poly(PBU-a), and poly(PBU-fa) was found to be 141°, 134°, 142°, 136°, and 142°, respectively. The results from the dielectric studies indicate that the benzoxazines (PBU-ffa and PBU-a) composites reinforced with palm flower silica (PF-SiO_2) and boron nitride-g-C_3N_4 (BN-g-C_3N_4) were found to be suitable for low and high dielectric applications. From these diverse studies, it can be determined that pyrimidinone-based benzoxazines to be utilized as high-performance products in the form of encapsulants, potting agents, and composites for automotive and applications.

Highlights

- Pyrimidinone core bisphenol has developed thr method.
- New pyrimidinone core bisphenol based benzox been developed.
- BN-g-C_3N_4 filled polybenzoxazine composites ha high-k applications.
- Palm flower ash filled polybenzoxazine compos low-k applications.
- Thermal and morphological behavior of compos

CONFLICT OF INTEREST STATEM

The authors declare no conflicts of interest.