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# Synthesis of a new type of bisphenol-BC-based benzoxazines from sustainable bio-phenol for hydrophobic, dielectric and corrosion-resistant applications

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## Abstract

The bifunctional phenol (BBC) was derived from a sustainable resource, viz., cardanol, which is utilized to prepare benzoxazines using five structurally different amines with paraformaldehyde through Mannich condensation. The molecular structure of the synthesized benzoxazines were confirmed by FTIR and  $^1\text{H-NMR}$  spectral analyses. The curing behavior of the benzoxazines was studied using DSC and among all the synthesized benzoxazines, BBC-imp exhibits lower curing temperature of 224 °C than that of others. The thermal stability of all the polybenzoxazines were analyzed using TGA and poly(BBC-a) was found to be better thermally stable than that of other polybenzoxazines. Poly(BBC-tfma) showed the highest value of water contact angle of 152° and the lowest value of dielectric constant of 4.50. All the synthesized BBC-based polybenzoxazines possess good anti-corrosion property with a protection efficiency of 99%. Data obtained from different studies suggest that the polybenzoxazines developed in the present work can be considered for possible use in the form of sealants, encapsulants, adhesives and coatings for microelectronics and other industrial applications for better performance.

## Graphical Abstract