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## Sesamol-based polybenzoxazines for ultra-low-*k*, high-*k* and hydrophobic coating applications†



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### Abstract

Four different series of sesamol-based benzoxazines were developed, and utilized for diverse applications, such as the hydrophobic coating on cotton fabrics, and low dielectric and high dielectric applications. By following the Mannich condensation reaction, various mono-functional and bifunctional benzoxazines based on sesamol were synthesized using different amines, for example, allylamine (aa), aminoethoxyethanol (aee), aminoethylpiperazine (aep), aniline (a), cyclohexylamine (cha), diaminodiphenyl ether (dde), diaminodiphenylmethane (ddm), dimethylaminopropylamine (dmapa), dodecylamine (dda), 4-fluoroaniline (fa), furfurylamine (ffa), imidazole propylamine (ipa), isophorone diamine (ipda), jeffamine D<sub>230</sub> (j), 4,4'-methylenebis(cyclohexylamine) (mbch), octadecylamine (oda), and trifluoromethylaniline (tfma). Making use of appropriate analytical techniques, the chemical structure, curing behavior, thermal stability, water contact angle (WCA) and dielectric characteristics were assessed. Poly(S-ffa) and poly(S-dde) have values of char yield of 62% and 65%, respectively, which are higher than any of the other polybenzoxazines studied. Among the polybenzoxazines studied, sesamol with (trifluoromethyl)aniline-based polybenzoxazine (poly(S-tfma)) possesses a higher WCA (152°) than those of rest of the synthesized polybenzoxazine samples. The WCA of poly(S-tfma) coated on cotton fabric was 163° which confirms the superhydrophobic behavior. The