

Abstract Submitted
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A New Bio-based Dielectric Material. MINGJIANG ZHAN, RICHARD P. WOOL, Dept Chemical Engineering, Univ Delaware — Low dielectric constant (low-k) materials are widely used in modern high-speed microelectronics, such as printed circuit boards. A new bio-based composite was developed from soybean oil and chicken feather fibers, which has the potential to replace currently used petroleum-based dielectrics. Feather fibers have a unique hollow structure which distinguishes them from glass fibers and give very attractive properties. Due to the retained air in the hollow fibers, the dielectric constant can be lower than conventional epoxy-based dielectrics at both low and high frequencies. The coefficients of thermal expansion (CTE) of the materials decrease with addition of feather fibers and even can be negative. By controlling the fraction of fibers, delamination caused by CTE mismatch between the dielectric and the metal lines can be avoided. The enhancement of adhesion between copper surface and polymer matrix was investigated. The tough structure of fibers significantly improved the mechanical properties of the composites, such as flexural properties and storage modulus. Supported by USDA

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