

## Mechanical and dielectric properties of polyhedral oligomeric silsesquioxanes modified graphene oxide/polyimide nanocomposites

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An effective method is proposed to prepare octa(aminophenyl) silsesquioxane (OAPS) functionalized graphene oxide (GO) reinforced polyimide (PI) composites with a low dielectric constant and ultra-high mechanical properties. The amine-functionalized surface of OAPS-GO is a versatile starting platform for in situ polymerization, which promotes the uniform dispersion of OAPS-GO in the PI matrix. Compared with GO/PI composites, the strong interfacial interaction between OAPS-GO and the PI matrix through covalent bonds facilitates a load transfer from the PI matrix to the OAPS-GO. The OAPS-GO/PI composite film with 3.0 wt% OAPS-GO exhibited an 11.2-folds increase in tensile strength, and a 10.4-folds enhancement in tensile modulus compared with neat PI. The dielectric constant (Dk) decreased with the increasing content of 2D-porous OAPS-GO, and a low Dk value of 1.9 was achieved.

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