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Hexagonal boron nitride/polymethyl-vinyl siloxane rubber dielectric thermally conductive composites with ideal thermal stabilities

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Abstract: Hexagonal boron nitride/polymethyl-vinyl siloxane rubber (*h*BN/VMQ) dielectric thermally conductive composites were fabricated *via* kneading followed by hot compression method. The thermally conductive coefficient (λ), thermal diffusion coefficient (α), dielectric constant (ε) and dielectric loss tangent ($tan\delta$) values were all increased with the increasing addition of *h*BN fillers. When the volume fraction of *h*BN fillers was 40 vol%, the corresponding λ and α was 1.110 W/mK and 1.174 mm^2/s, 6 and 9 times than that of pure VMQ matrix, respectively. The corresponding ε and $tan\delta$ was 3.51 and 0.0054, respectively. Furthermore, the tensile strength and $T_{Heat\text{-}resistance\ index}$ (T_{HRI}) values were both maximum with 20 vol% *h*BN fillers, tensile strength of 3.31 MPa, 12 times than that of pure VMQ matrix (0.28 MPa), and T_{HRI} of 253.8°C. The obtained *h*BN/VMQ composites present great potential for packaging in continuous integration and miniaturization of microelectronic devices.

Keywords: A. Polymer-matrix composites (PMCs); B. Thermal properties; D. Compression moulding.

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