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M1Po2C-06 [40]: Influence of Curing Temperature on Thermal Conductivity and Electrical Insulation Properties of Epoxy/Aluminum Nitride Composites

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Epoxy/aluminum nitride composites (EP/AlN) with high thermal conductivity, low thermal expansion and excellent insulation characteristics are particularly suitable for protecting a superconducting power equipment from the permanent damage of temperature rise and internal stress in quenching process. In this work, micro/nano AlN particles were used as fillers to improve the thermal conductivity and electrical insulation properties of neat epoxy. As a critical factor for the impregnation process, the effect of curing temperature on thermal conductivity and electrical insulation properties of AlN/EP were systematically investigated based on the AlN/EP samples (60% filler content of AlN-2 μ m and AlN-600nm (50%/50%)), which were respectively cured at temperature from 0oC to 80oC. Low curing temperature is advantageous for improving the thermal conductivity, volume resistivity, surface resistivity and surface flashover breakdown voltage of obtained epoxy composites, which is attributed to different dispersion states of AlN fillers in epoxy matrix. This study offers an experimental basis for the impregnation process and electrical application of dielectric polymer composites with high thermal conductivity in HTS equipment' manufacture.

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