

Thermal conductivity of aluminar/silicone resins

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High thermal conductivity is needed for appreciable levels of thermal conductance; i.e. the application of polymers in the parts which require high thermal dissipation. For this reason, polymers containing thermal conductive fillers are emerging as one of the most economical and effective ways to cope with thermal management issues. However, with the excess addition of aluminar, an incomplete dispersion of aluminar occurs, and more stress concentration points are formed. The mechanical properties of the composites rapidly decrease accordingly. Thermal conductive aluminar particle filled silicone resins composites with silicone oil (SO) as a plasticizer were fabricated for potential solar cell back sheet applications. Effect of aluminar loading on thermal properties of the composites studies and a better transition range of 50-60 vol% was observed. Interconnection of aluminar particle and continuous morphology in the silicone resins were used to reveal the thermal conductive mechanisms of the composites. The presence of SO reduced the tensile modulus of the composites without lowering tensile strength and the elongation at break.