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Epoxy-silica composites for micro-electronic applications: effect of filler HYUKSOO LEE, Samsung Electro-mechanics Co., MYEONGHO HONG, CHOONKEUN LEE, ILSANG MAENG, JAECHOON CHO, SANGMOON LEE, JEONGBOK KWAK, SEUNGHYUN RA — The epoxy composites filled with silica fillers having various amounts and sizes were prepared and a detailed study of the structure-property relationships of the resulting composites is reported. Scanning electron microscopy (SEM), thermomechanical analyzer (TMA), rheological behavior, and stress-strain analysis were used to evaluate the epoxy-silica composite morphology and physical properties. The stiffness and thermal expansion were improved with increasing filler amount. Whereas, the ductility decreased significantly as the filler content increased. Scanning electron micrographs of fractured composites revealed that the dispersion of the filler in the matrix is highly dependent on the size and amount of fillers and has a strong effect on the mechanical, thermal, and rheological properties of the composites. The processibility of the composites for micro-electronic applications such as printed circuit board (PCB), is briefly discussed.

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