

**IMPACT Center SAB/Liaison Meetings
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Abstract

Novel Nanostructured Thermal Management Materials

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Nanoparticle Based Heat Spreaders

For thermal vias, RF interposers, and packaging, a diamond composite in which micron size diamonds are thermally fused by thin layers of ALD Al_2O_3 or AlN is nearly ideal. These diamond composite films would be nearly ideal because the films can be electrically insulating, have high thermal conductivity, and be formed in arbitrary shapes. We have developed a method to deposit monodisperse or polydisperse diamonds in a matrix. Within the diamond matrix, the diamonds are in contact and with each other and are subsequently thermally and mechanically fused by ALD Al_2O_3 or AlN . A process has been developed to infill a polymer between the diamonds, inside the voids of the diamond matrix. Techniques are now being developed to infill the diamond matrix with Ag (silver) and alternatively with SiO_2 .