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Sn/SnO and Ag hybrid carbon nanotubes and graphene for thermal interface material and interconnections with hybrid carbon nanotubes**Jagjiwan Mittal***AINT, Amity University Noida UP, India*

Sn/SnO coated & filled multiwall carbon nanotubes (MWCNTs) and coated few layer graphene (FLG) were successfully prepared by reacting with SnCl₂ and reducing under H₂/N₂ gas. The thermal diffusivity (TD) and thermal conductivity (TC) of hybrid nanotubes of 1 mm thickness pellet by laser method was increased to 4.41 mm²/sec, 5.39 W/m.K of as compared to 0.36mm²/sec and 0.28 W/m.K of the pristine nanotubes. Whereas, in case of hybrid FLG, TC was surged to 7.91 mm²/s, 14.41 W/m.K from 2.17 mm²/s and 3.27 W/m.K of the pristine FLG, respectively. The enhancement in thermal conductivity is attributed to the presence of Sn coating on surface and inside the carbon nanotubes and coating Sn on the surface of graphene the formation of compact structures by reducing the air gaps between nanotubes because of their joining during compression and sintering. Current-voltage measurements using tuna probe in atomic force microscopy demonstrated the higher number of negative charge carriers in the hybrid FLG compared to pristine FLG because of electron transfer from graphene to Sn. Study using transmission electron microscopy showed the development of interconnection using Sn/SnO hybrid graphene with Sn coated and filled MWCNTs.

In another method, a simple method to coated and filled with silver Bulk thermal diffusivity and thermal conductivity of Ag hybrid MWCNTs were increased by 242% and 255%, respectively. Furthermore, current-voltage measurements using tuna probe in atomic force microscopy showed higher number of charge carriers in the Ag hybrid nanotubes compared to pristine MWCNTs which resulted in up to 173% increase in their electrical conductivity.

Biography

Jagjiwan Mittal received his M Tech and PhD degrees in Chemistry from IIT Delhi, India. Besides India, he worked as JSPS fellow in Japan, CNRS Associate Researcher in France, and post doc. in Taiwan. His specialization is in materials chemistry particularly carbon and graphitic materials including graphene and carbon nanotubes. His current research work include development and application studies on different nanomaterials ranges from carbon nanotubes, graphene, solder metals and alloys, metal nanoparticles and nanofibers. At present, he is working as Associate professor in Amity University

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