Abstract Submitted
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**Unusual thermal conduction characteristics of phase change composites with single-walled carbon nanotube inclusion**[1] SIVASANKARAN HARISH, KEI ISHIKAWA, SHOHEI CHIASHI, JUNICHIRO SHIOMI, SHIGEO MARUYAMA, The University of Tokyo, Japan — Thermal energy storage using phase transition materials is often employed in many engineering applications. However, the low thermal conductivity of such materials inhibits its use for large scale applications. Recently, Zheng et al. [Nature Comm. 2011] demonstrated an efficient technique using graphite suspensions to tune the thermal and electrical conductivity using temperature regulation. In this work, we report large contrasts in thermal conductivity enhancement of nano composites with single walled carbon nanotube (SWCNT) inclusions using first order phase transition process. SWCNTs synthesized by alcohol CVD were dispersed in n-octadecane by tip-sonication with sodium deoxycholate as the surfactant. Thermal conductivity measurements were carried out with transient hot-wire system [Mater. Express 2012]. Thermal conductivity enhancement in the liquid state was found to be nominal and is consistent with the predictions of Maxwell- Garnett type effective medium theory. However, in the frozen state nearly a 2.5 fold increase in thermal conductivity was observed. Similar temperature dependent thermal conductivity contrast was observed when exfoliated graphite nanoplatelets were used as the inclusions.

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