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Thermal Properties of Graphene Sheet Composites DIMITRIOS PAPAVASSILIOU, KHOA BUI, The University of Oklahoma — Recent reports about extremely high values for the thermal conductivity of single-layer graphene sheets (GS) that outperform carbon nanotubes (CNT) in heat conduction give rise to the expectation that GS nano-composites could be able to make the unfulfilled promise of CNT composites a reality. The presence of resistance to the transfer of heat at the inclusion- matrix interface, known as the Kapitza resistance, is the reason for achieving worse results than anticipated with CNT composites. In this work, we investigate the effective conductivity of GS composites by means of off-lattice Monte- Carlo algorithms. This method is more efficient than conventional algorithms and faster than molecular dynamics. We will present the methodology, which is used to study the effects of GS orientation, dispersion and volume fraction on the effective thermal conductivity of the GS composites. The discussion will include a comparison between theoretical predictions of the value of the thermal resistance at the GS- polymer interface relative to the CNT-polymer interface based on the acoustic mismatch theory, and a comparison between CNT composites and GS composites with similar volume fraction and similar dispersion pattern of the nano-inclusions in the composite matrix.

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