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Development and Measurement of Carbon Nanotube-metal composite conductors MIKE SUMPTION, Ohio State Univ - Columbus — There is a significant opportunity for the development of CNT-metal composites with high electrical and thermal conductivity, as well as high current density. Such conductors, aiming at high conductivity and/or high conductivity per unit weight, have potential applications in electronics, transportation, and high power density applications. In this work, we discuss the development of CNT/metal composites based on powder in tube, electrochemical metallization, and co-deposition approaches. Our composites are formed with Cu and Al metals, and various CNT and graphene additions. Functionalization both during and after composite fabrication are discussed. A particularly promising approach appears to be the encapsulation and functionalization of CNT yarns. We have measured both electrical and thermal conductivity in the temperature range from room temperature to 400C, as well as conductor ampacity. Absolute as well as mass-normalized electrical and thermal conductivity results are discussed, and it is seen that results on a mass based basis are already of potential application interest for some composites.

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