Abstract Submitted
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Enhanced Electrical Conductivity of Aluminum by Carbon Nanotube Hybrid Dilution[1] SHELBY STIGERS, The Pennsylvania State University-Altoona College, ALEXADER SAVADELIS, KATHRYN CARRUBA, KILEY JOHNS, The Pennsylvania State University, KOFI ADU, The Pennsylvania State University-Altoona College — Carbon nanotubes (CNTs) have been recognized as potential candidate for reinforcements in lightweight metals. A composite consisting of CNTs embedded in an Al-matrix might work as an ultra-low-resistive material with the potential of having a room-temperature resistivity far below Al, Cu and Ag. While several advances have been made in developing Al-CNT composites, three major challenges: (1) interfacial bond strength between CNT and the Al matrix, (2) homogeneous dispersion of the CNTs in the Al matrix and impurity (CNTs) scattering centers, continue to limit progress in Al-CNT composites. Several conventional methods including powder metallurgy, melting and solidification, thermal spray and electrochemical deposition have been used to process Al and CNT to form composites. We present preliminary results that address these challenges and demonstrate the fabrication of easily drawable Al-CNT composites into wires of diameter $\leq$ 1.0mm with $\sim 18\% \pm 2\%$ reduction in the electrical resistivity of Al-CNT composite using CNT-hybrid as reinforcement and an inductive melting technique that takes advantage of the induced eddy current in the melt to provide *in-situ* stirring.

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