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Single-wall carbon nanotube aerogels M. B. BRYNING, University of Pennsylvania, M. F. ISLAM, Carnegie Mellon University, L. A. HOUGH, Rhodia, A. G. YODH, University of Pennsylvania — Aerogels of single-wall carbon nanotubes (SWNTs) were created by freeze drying and critical point drying of aqueous SWNT gels. The resulting aerogels maintain the strongly-connected three-dimensional SWNT network of the original gel and have density less than 0.1 g/cm³. While these pure SWNT aerogels are self-supporting, reinforcement with small amounts of added polyvinylalcohol (PVA) produces much stronger structures that are easy to handle. Electrical conductivity of order 1 S/cm is observed in the self-supporting aerogels, and similar conductivity can be achieved in PVA-reinforced aerogels through additional processing. The aerogels can be backfilled with polymers such as epoxy to create composite materials that retain the high conductivity of the network. Other potential applications for these structures, such as sensors, actuators, and thermoelectric devices, are currently being explored. This work is supported by grants from NSF (MRSEC DMR05-20020 and DMR-0505048) and NASA NAG8-2172.

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