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Thermal Oxidation Profiling of Single-Walled Carbon Nanotubes BRIAN LANDI, CORY CRESS, CHRIS EVANS, RYNE RAFFAELLE, NanoPower Research Labs, R.I.T. — A method of thermal oxidation profiling (TOP) to monitor the properties of single-walled carbon nanotube (SWNT)-containing samples has been developed. In the present analysis, the thermal decomposition of raw and acid-refluxed SWNT samples is evaluated by a systematic series of oxidative thermal treatments with subsequent calculation of the SWNT mass retention using a verified purity assessment technique. The TOP results indicate that there are no discernable regions of a raw soot TGA curve that can be ascribed to SWNT combustion independent of impurity influence. In contrast, the acid-refluxed SWNT sample shows that chemical oxidation of the metal can enable optimization of SWNT retention during thermal purification. The established understanding allows for purification efficiencies (the highest purity at the maximum retention) of 75% w/w to be achieved in laser-produced SWNTs, without modification to the diameter distribution.

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