Electronic Supplementary Material (ESI) for Nanoscale.

Radio Frequency Heating of Metallic and Semiconducting Single-Walled Carbon Nanotubes

Muhammad Anas[1], Yang Zhao†[2], Mohammad A. Saed[3], Kirk J. Ziegler[2,4], Micah J. Green[*1,5]

[1] Artie McFerrin Department of Chemical Engineering, Texas A&M University, College Station, TX, USA

[2] Department of Chemical Engineering, University of Florida, Gainesville, FL, USA

[3] Department of Electrical and Computer Engineering, Texas Tech University, Lubbock, TX, USA

[4] Department of Materials Science & Engineering, University of Florida, Gainesville, FL, USA

[5] Department of Materials Science & Engineering, Texas A&M University, College Station, TX, USA

Current address: † Postdoctoral Researcher, University of Pennsylvania, Department of Chemical and Biomolecular Engineering, Philadelphia, PA 19104, USA

[*]Corresponding author, email: micah.green@tamu.edu

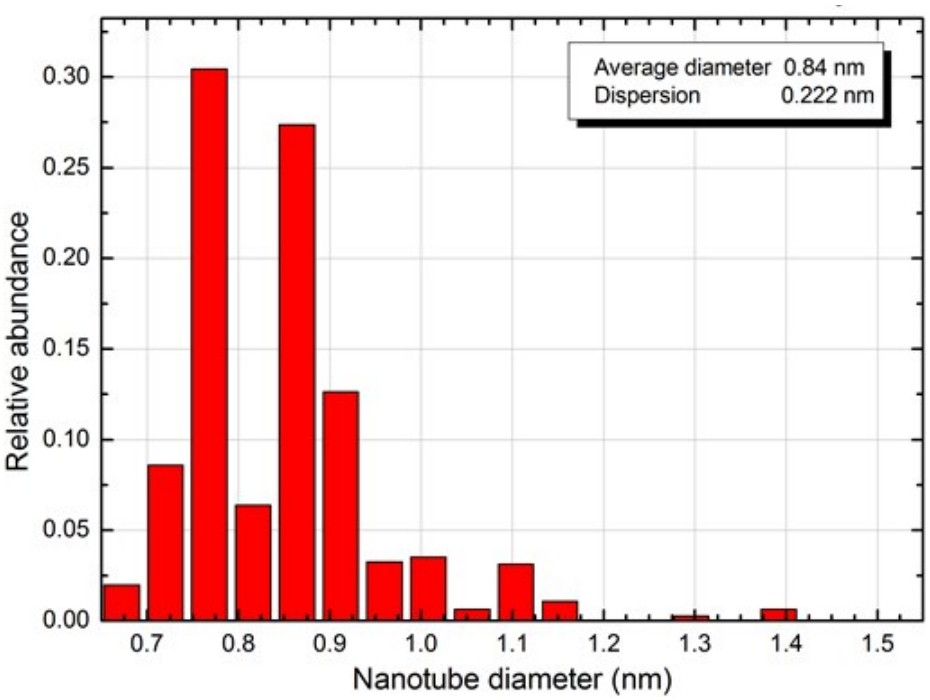

Figure S1. Diameter distribution of initial SWCNT dispersion using fluorescence analysis.

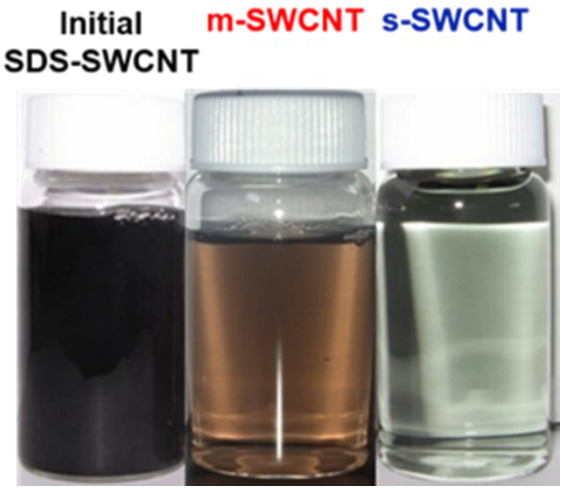

Figure S2. Images of initial SWCNT dispersion, m-SWCNT SDS-based dispersion, and s-SWCNT DOC-based dispersion.

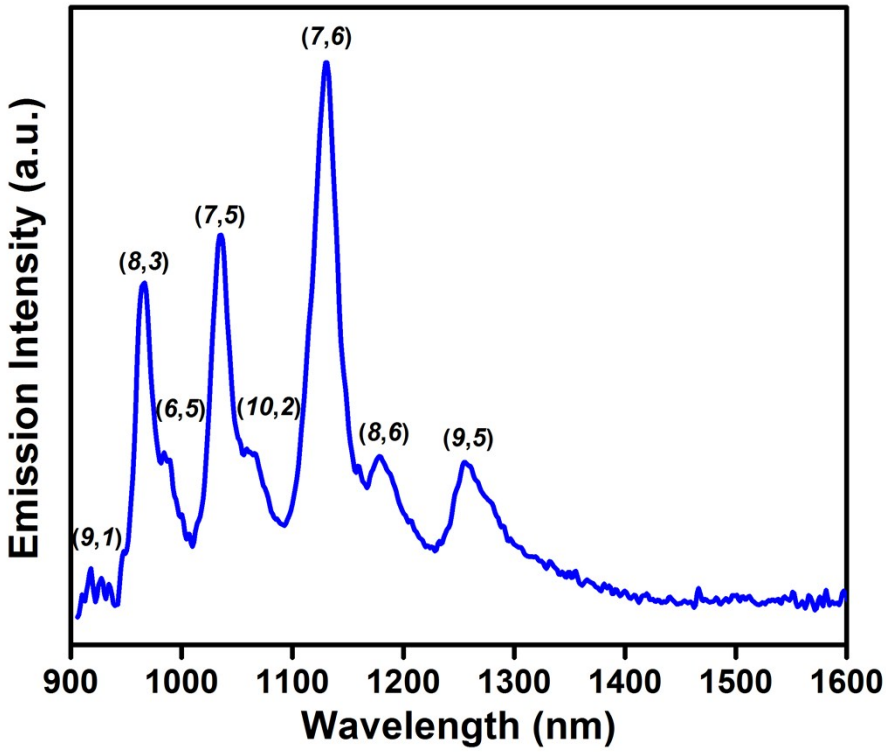

Figure S3. Normalized fluorescence spectra (excited at 662 nm) of 11.7 ppm s-SWCNTs dispersed in DOC solution. Corresponding major (*n*,*m*) types are labeled in the figure.

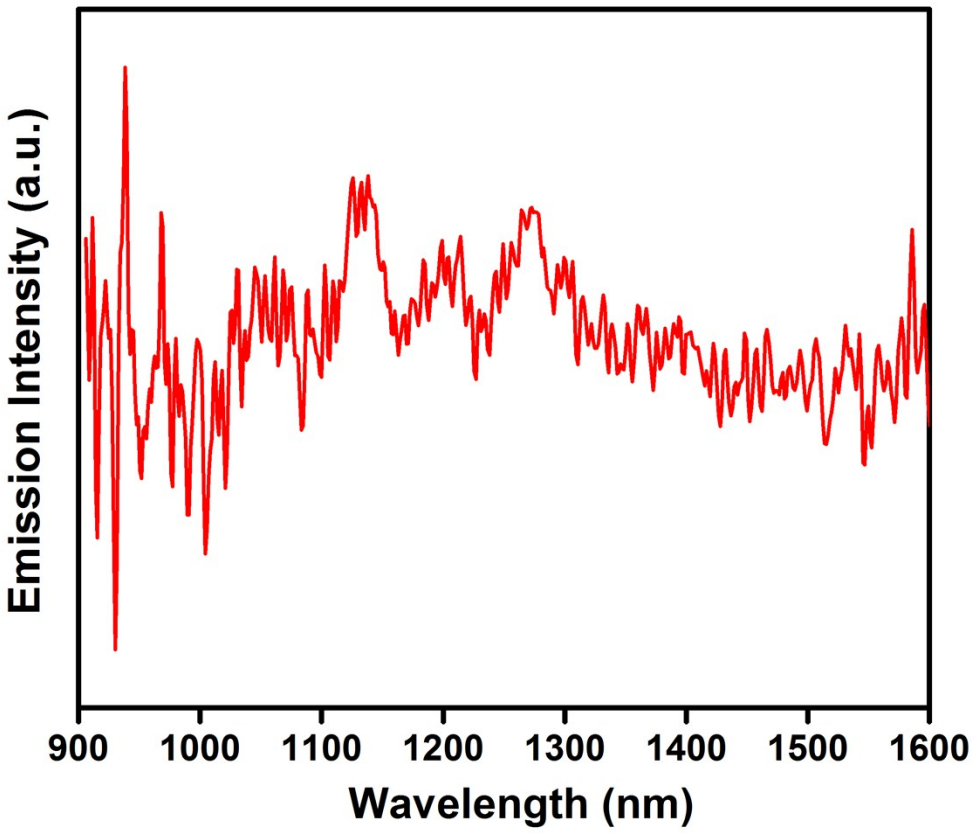

Figure S4. Normalized fluorescence spectra (excited at 662 nm) of 2.71 ppm m-SWCNTs dispersed in DOC solution.

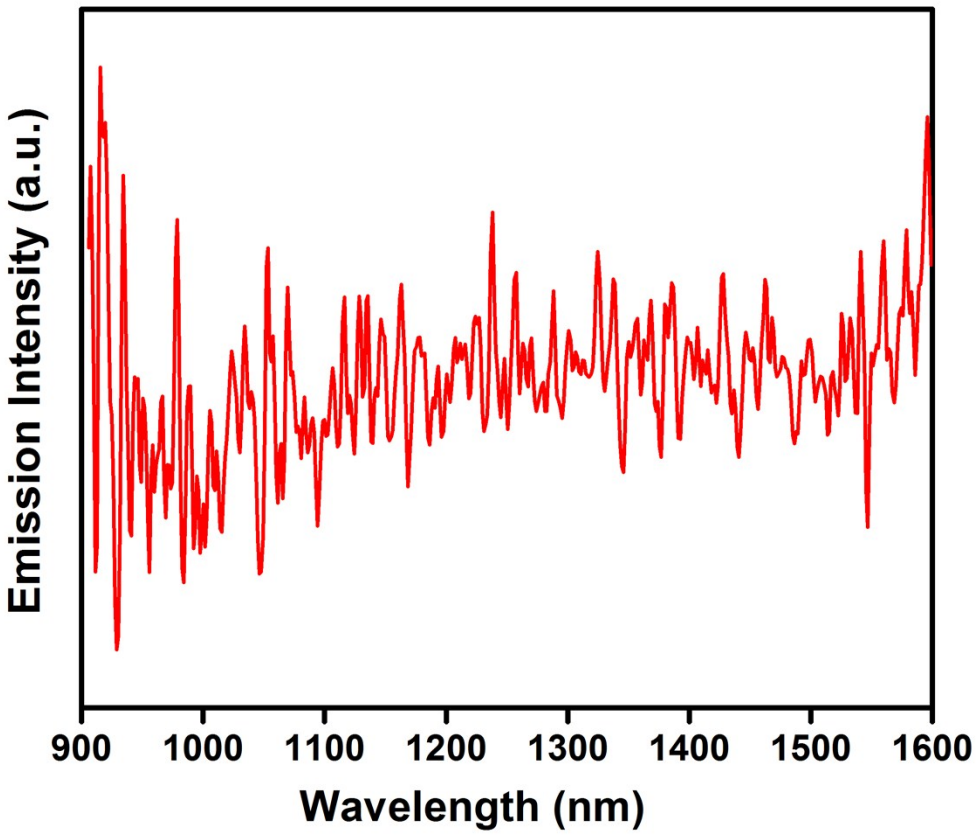

Figure S5. Normalized fluorescence spectra (excited at 662 nm) of 5.10 ppm m-SWCNTs dispersed in SDS solution.

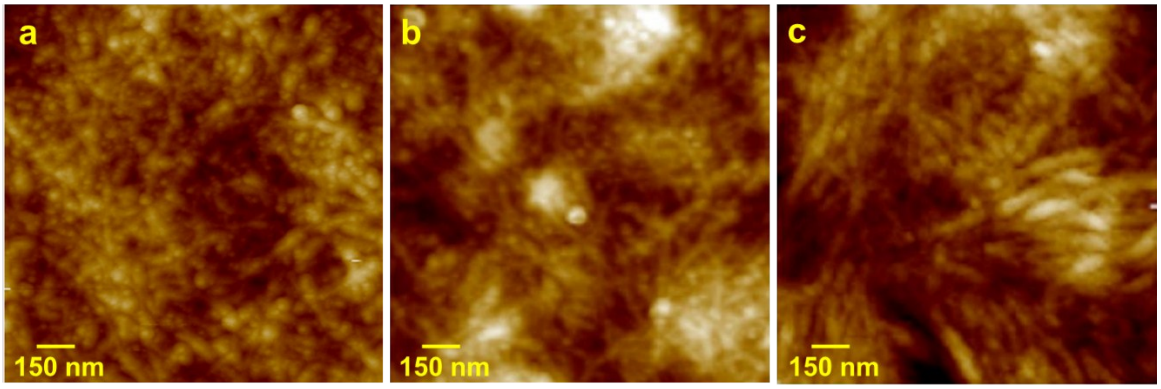

Figure S6. AFM images of 9.6 μg/cm^2 films of (a) s-SWCNT from DOC-based dispersion, (b) m-SWCNT from DOC-based dispersion, and (c) m-SWCNT from SDS-based dispersion.

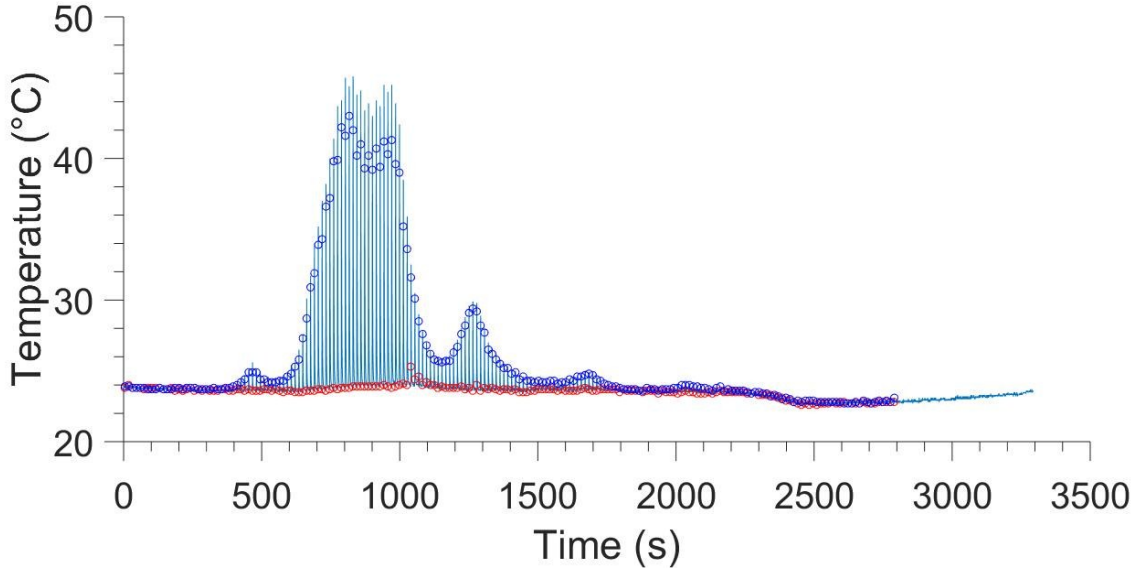

Figure S7. Thermographic spectroscopy data of s-SWCNT film from DOC-based dispersion heated via 1.0 W RF power in the frequency range of 1-200 MHz, red circles (bottom of the curve) indicate start point, blue circles (upper portion of curves) indicate the end point for the slope calculation.

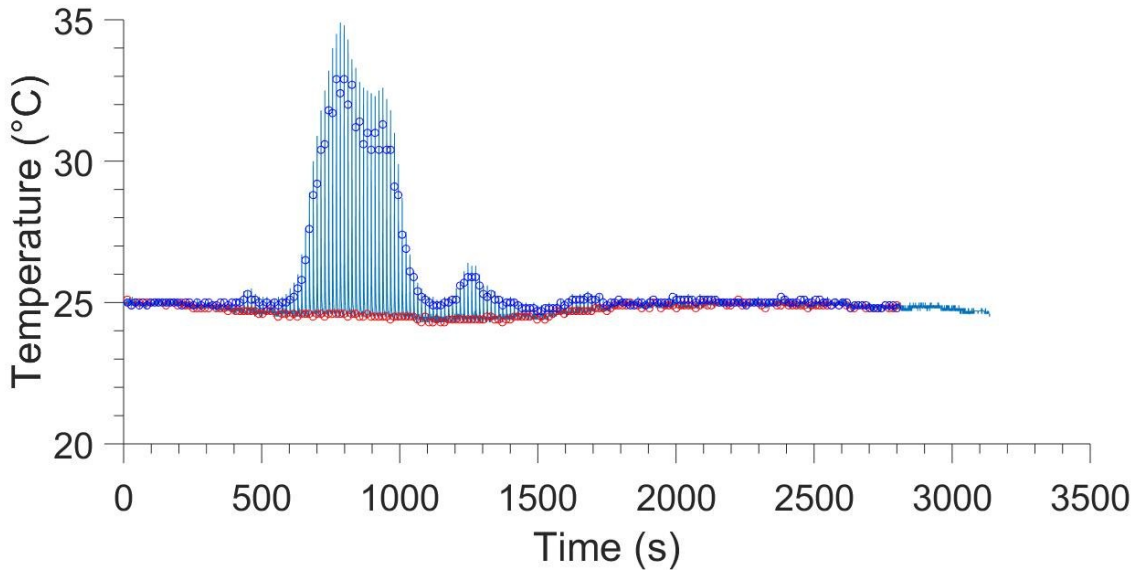

Figure S8. Thermographic spectroscopy data of m-SWCNT film from DOC-based dispersion heated via 1.0 W RF power in the frequency range of 1-200 MHz, red circles (bottom of the curve) indicate start point, blue circles (upper portion of curves) indicate the end point for the slope calculation.

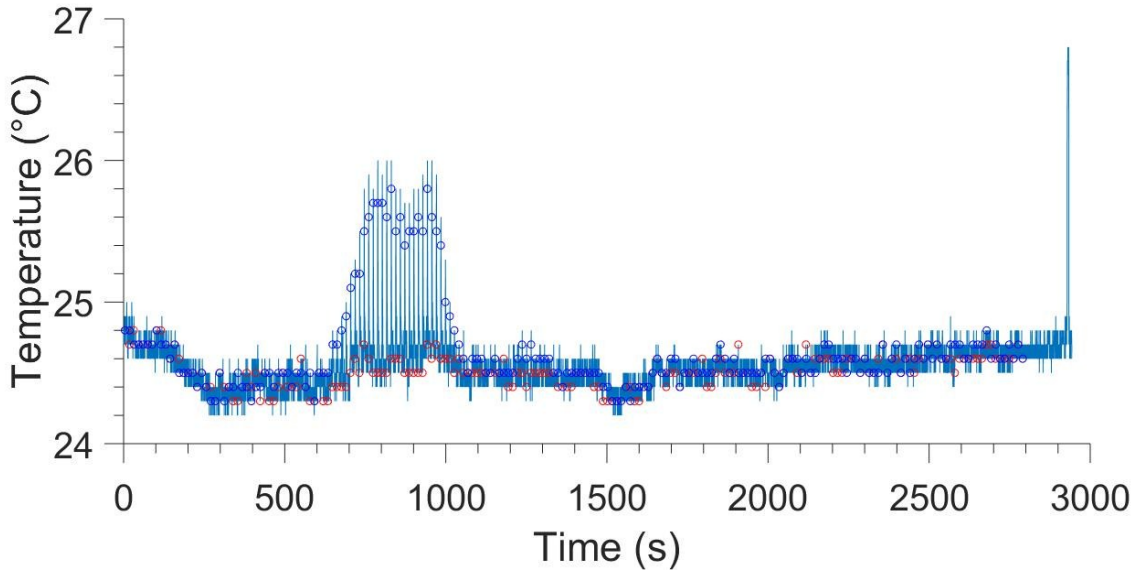

Figure S9. Thermographic spectroscopy data of m-SWCNT film from SDS-based dispersion heated via 1.0 W RF power in the frequency range of 1-200 MHz, red circles (bottom of the curve) indicate start point, blue circles (upper portion of curves) indicate the end point for the slope calculation.

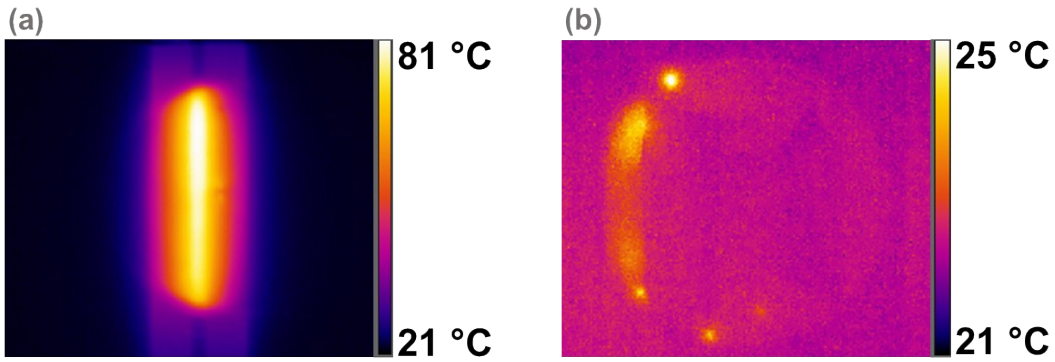

Figure S10. Thermal images of (a) s-SWCNT film from DOC-based dispersion and (b) m-SWCNT film from SDS-based dispersion heated via 3.2 W RF power at a frequency of 70 MHz.

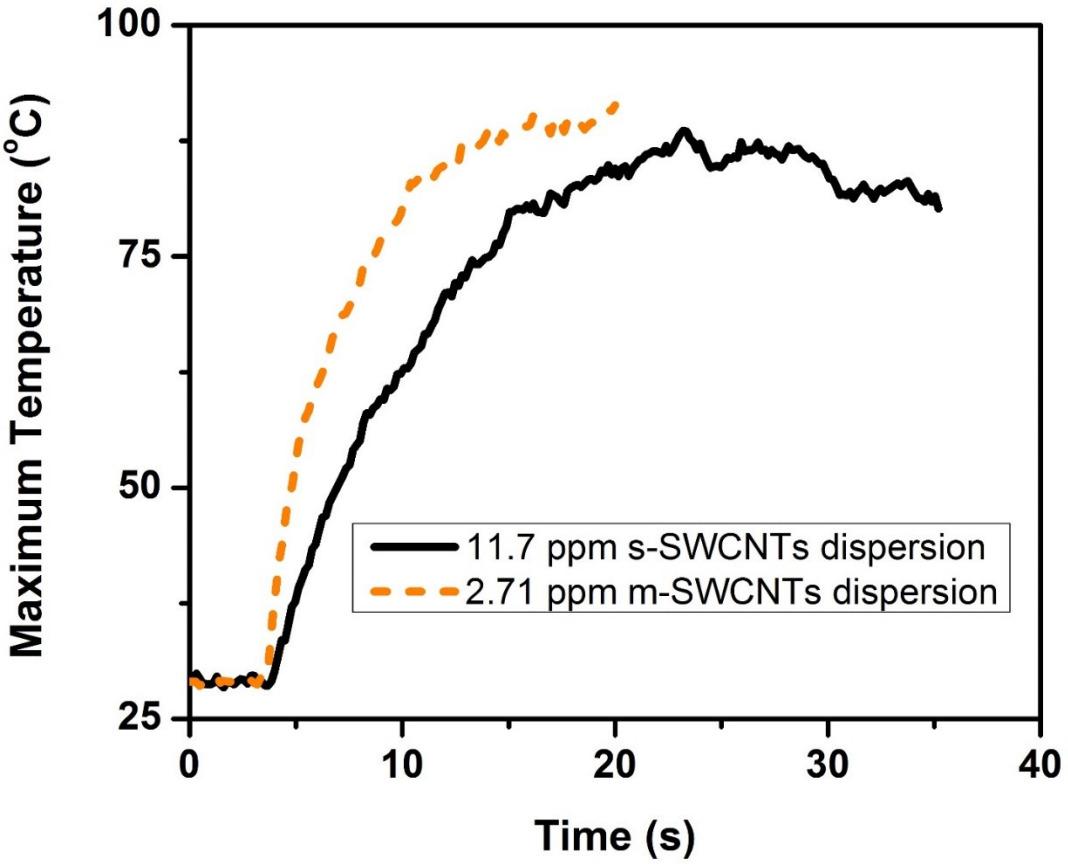

Figure S11. Maximum temperature as a function of time for a drop of DOC-based dispersions of s- and m-SWCNTs casted on a glass slide and heated via 3.2 W RF power and a resonance frequency of 81 MHz.

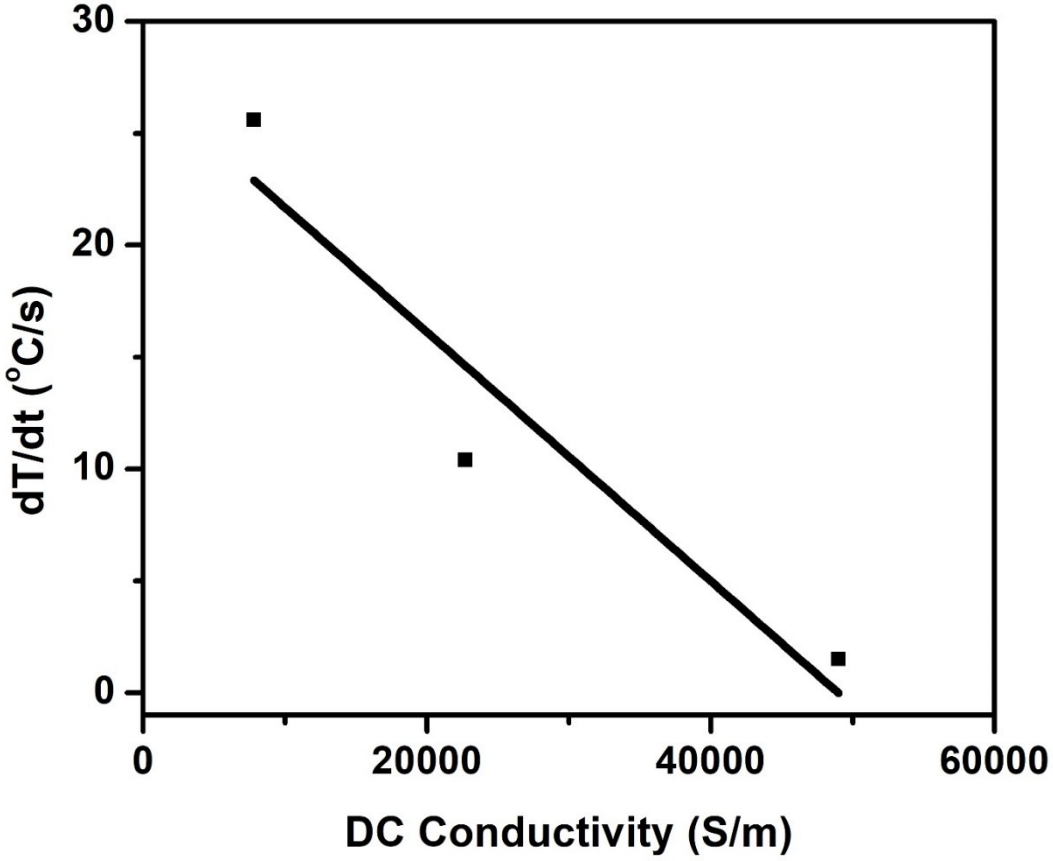

Figure S12. Heating rate as a function of DC conductivity for m- and s-SWCNT films.