Electronic Supplementary Material (ESI) for Nanoscale.

Flexible Prototype Thermoelectric Devices Based on Ag_2Te and PEDOT:PSS Coated Nylon Fibre: Electronic Supplementary Information

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Effects of nanocrystal morphology and number of dip coating cycles

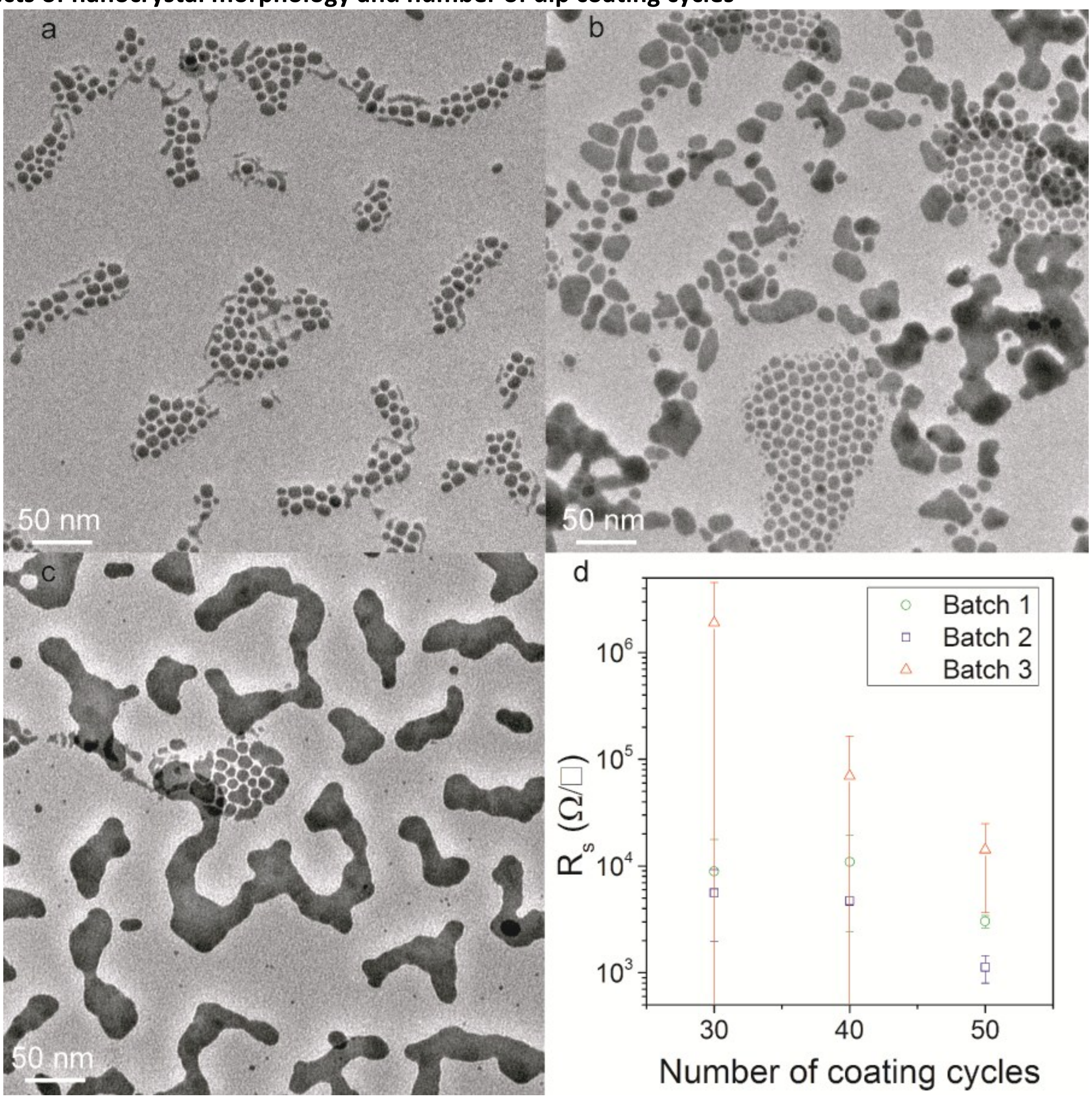

Figure S1. Effect of nanocrystal size and number of coating cycles on the sheet resistance of untreated Ag_2Te nanocrystal coated nylon fibre mesh. (a) TEM image of Batch 1. (b) TEM image of Batch 2. (c) TEM image of Batch 3. (d) Sheet resistance of Ag_2Te nanocrystal coated nylon fibre mesh.

MMR SB100 Seebeck coefficient measurements

Seebeck coefficient results listed in Figure 2d are estimated from measurements taken using an MMR SB100 measurement device. The principle of the device operation is described in some detail in a recent publication by the Murray group.[1] A reference of known Seebeck coefficient and a sample are bridged between a temperature controlled thermal reservoir and a second thermal reservoir. The voltages across the reference and sample are measured. For measurements near room temperature the voltage drops are small due to there being essentially no application of a temperature gradient. The system then heats the second thermal reservoir, which generates a temperature difference across the reference and sample. The voltages are measured again. Thus, the temperature difference associated with the heater is calculated as

$$\Delta T = - S_{reference} \cdot \Delta V_{reference}$$

where $S_{reference}$ is the Seebeck coefficient of the reference material and $\Delta V_{reference}$ is the difference in voltage drop across the reference with and without second thermal reservoir heating. Assuming that the same temperature differences that exist across the reference also exists across the sample, the Seebeck coefficient of the sample can be estimated as

$$S_{sample} = - \Delta V_{sample} / \Delta T$$

where ΔV_{sample} is the difference in voltage drop across the sample with and without second thermal reservoir heating. The results from these measurements are shown in Table S1 below.

Table S1. Experimental results from MMR SB100 Seebeck coefficient measurements.

Sample	$\Delta V_{reference}$ (μV)	$S_{reference}$ (μV/K)	ΔT (K)	ΔV_{sample} (μV/K)	S_{sample} (μV/K)
Untreated	190	-41	4.6	363	-78
Annealed	146	-41	3.6	-259	72
Air plasma treated	153	-41	3.8	84	-22
PEDOT:PSS	151	-41	3.7	-55	15

Reference:

1. D. Ko and C. B. Murray, *ACS Nano*, 2011, **5**, 4810–4817.