Supplementary Materials: Factors that Affect Network Formation in Carbon Nanotube Composites and Their Resultant Electrical Properties

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Table 1. MWCNT/Polymer Composite Electrical Data.

Material	Mixing Method	Diameter (nm)	Length (um)	Percolation Threshold (wt %)	Max Conductivity Concentration (wt%)	Max Conductivity (S/m)	Ref.
Epoxy	-	15	50	0.011	1	0.433	[1]
Epoxy	-	-	-	0.4	1	6.9	[2]
Epoxy	-	-	-	0.1	1	7.7	[2]
Epoxy	-	-	-	0.275	1	6.9	[2]
Epoxy	-	-	-	-	1	1.9	[2]
Epoxy	-	50	80	0.01	0.5	0.574	[3]
Epoxy	-	50	10	2.75E-03	0.01009	8.62E-03	[4]
Epoxy	-	50	17	2.53E-03	0.00999	2.63E-03	[4]
Epoxy	-	50	43	5E-03	0.01016	1.95E-04	[4]
Epoxy	-	10	3	0.0383	0.14695	0.442	[5]
Epoxy	-	40–60	0.540	0.4	10	23.31	[6]
Epoxy	-	50	17	2.5E-03	1	1.44	[7]
Epoxy	-	15	50	0.0982	0.5	8.23E-03	[8]
Epoxy	-	10–15	0.1–10	0.113	1.63	0.0409	[9]
PA6	Melt	10–1000	-	2	4	0.1	[10]
PA6	Melt	10	0.1–10	-	5	0.0641	[11]
PA66	Melt	10	0.1–10	-	5	0.119	[11]
PA66	Melt	10	0.1–10	0.24266	4.00702	13.42	[12]
PA66	Melt	1-5 and 4-15	-	0.2665	5.00745	0.585	[12]
PA66	Melt	10–80	-	0.99848	3.01335	0.256	[12]
PA66	Melt	10–80	-	0.08788	1.98141	13.92	[12]
PA66	Melt	10–40	-	0.08307	0.9683	19.57	[12]
PA66	Melt	<10	-	1.00442	1.98418	0.765	[12]
PA66	Melt	<10	-	3.98871	6.02251	0.054	[12]
PA12	Melt	10	0.1-10	0.7	5	0.279	[13]
PC	Melt	10	1.5	0.5	5	26.88	[14]
PC	Melt	12	>10	0.875–1	3	90	[15]
PC	Melt	20	50	5	15	1.00E-04	[16]
PC	Melt	10–15	1–10	1–1.5	5	9.58	[17]
PC	Melt	10–15	1–10	2	15	20.33	[18]
PC	Melt	9.5	1.5	1.1	3	2.32E-04	[19]
PC	Melt	9.5	1.5	0.11	2	96.3	[19]
PC	Solution	6–9	10–20	2.12			[20]
PC	Solution	9–12	10–15	0.5	7	10	[21]
PC	Solution	9–12	10–15	5	7	0.1	[21]

UHMWPE	Mechanical	12-20	10	<2.3E-03	0.00844	0.102	[22]
PE	Melt	10–30	1–10	7.5	10	0.20661	[23]
UHMWPE	Solution	10–120	540	0.28	1	10	[24]
PE	Melt	10–30	1–10	7.5	10	1.00E-03	[23]
HDPE	Melt	9.5	1.5	0.695	12.17018	6.73E-03	[25]
HDPE	Melt	9.5	1.5	0.905	21.51		[9]
HDPE	Melt	9.5	1.5	1	16.2	1.00E+02	[26]
LLDPE	Melt	10	1.34	2.5	10	1.76	[27]
LLDPE	Melt	10	1.34	2.5	5	10.88	[27]
LLDPE	Melt	10	1.34	2	5	2.48	[27]
PMMA	Mechanical	~20	0.5–2	0.05	0.249	0.237	[28]
PMMA	Mechanical	~20	0.5–2	0.5	0.99	0.495	[29]
PMMA	Melt	~20	0.5–2	0.0387	13.04	0.0336	[28]
PMMA	Melt	10–30	1–10	8.5–10	10	4.11E-08	[30]
PMMA	Melt	9.5	1.5	0.88	8	50	[31]
PMMA	Melt	2–10	<1	0.5	1	1E-05	[32]
PMMA	Melt	6–20	1–5	not reached	6	6.67E-15	[32]
PMMA	Melt	10–30	10	7.75	9	1E-04	[32]
PMMA	Melt	~10	<1	not reached	6	1E-14	[32]
PMMA	Solution	-	-	0.084	1.5	200	[33]
PMMA	Solution	D/L=1000		0.12	1.5	0.8	[34]
PMMA	Solution	-	-	0.2	10	100	[35]
PMMA	Solution	D/L=100		0.65	1.5	0.08	[34]
PMMA	Solution	D/L=1000–1600		0.051	3	0.1	[36]
PMMA	Solution	D/L=1000–1600		9.6 E-03	3	5	[36]
PMMA	Solution	D/L=1000–1600		0.45	3	0.01	[36]
PMMA	Solution	-	-	0.3	1.6	10	[37]
PMMA	Solution	10–20	several tens of mm to cm	9.9E-03	3	12	[38]
PMMA	Solution	10–20	several tens of mm to cm	0.0483	3	11	[38]
PMMA	Solution	10–20	several tens of mm to cm	0.149	3	10	[38]
PMMA	Solution	~20	0.5–2	1.96	2.68	0.345	[28]
iPP	Melt	9.5	1.5	2.81	30	10	[39]
PP	Melt	10	1.5	1-2	5	1.00E-03	[40]
PP	Melt	3–20	-	0.51	6	1.69E-01	[41]
iPP	Melt	10–20	10-50	<2	5	0.297	[42]
iPP	Melt	10–12	10-15	1	5	93	[43]
iPP	Melt	10	10–15	1.5	5	91	[43]
PP	Melt	10	1.34	0.5	5	3.51	[44]
PP	Melt	10.5	0.77	1.5	5	0.364	[44]
PP	Melt	10–15	10–20	2	10	4.6	[45]
PP	Melt	10–15	10–20	2	10	2.58	[45]
PP	Melt	10–15	10–20	5	10	0.106	[45]

Table S2. SWCNT/Polymer Composite Electrical Data

Material	Mixing Method	Diameter (nm)	Length (um)	Percolation Threshold (wt %)	Max Conductivity Concentration (wt%)	Max Conductivity (S/m)	Ref.
Epoxy	-	1–1.2	2–20	0.074	0.21	1.25E-03	[46]
Epoxy	-	2	10	0.05	0.3	2.60E-03	[8]
Epoxy	-	2	several	0.05	0.5	3.83E-02	[3]
Epoxy	-	2	several	0.251	0.5	1.08E-03	[3]
Epoxy	Laser oven	-	-	7.39E-05	1.93E-03	2.11E-02	[47]
Epoxy	Sonicured	-	-	1.42E-04	5.94E-03	3.41E-03	[47]
Epoxy	HiPco	1.35	0.516	1.21E-04	5.18E-04	1.63E-08	[47]
Epoxy	Sonicured	1.35	0.516	3.27E-04	3.4E-3	1.91E-03	[47]
Epoxy	-	3	-	3.00E-01	2.50E+00	1.30E-02	[48]
Epoxy	-	1.0–2.0	-	6.20E-02	1.50E+01	1.97E-01	[49]
Epoxy	-	-	-	3.00E-01	3.00E+00	9.54E-01	[50]
PC	Melt	1–1.3	-	2.5	7.52	9.67E-02	[51]
PC	Soln w SWNT	-	4.0–6.0	6.35E-01	7.51E+00	2.73E+00	[52]
PC	Soln with HiPco	-	4.0–6.0	3.29E-01	1.01E+00	7.01E+00	[52]
PC	Melt with HiPco	-	4.0–6.0	7.76E-01	1.27E+00	1.13E-02	[52]
PC	Melt with SWNT	-	4.0–6.0	1.53E+00	1.00E+01	1.48E-01	[52]
PC	Melt with SWNT carboxyl groups	-	4.0–6.0	1.27E+00	5.04E+00	4.08E-02	[52]
PC	Melt SWNT predispersed	-	4.0–6.0	1.76E+00	5.01E+00	1.24E-01	[52]
PE	Melt	0.8–2	-	4	6	9.03	[53]
PE	Soln	1.2–1.5	-	4.89E-01	3.49E+00	8.35E+01	[24]
PE	Soln	1.2–1.5	-	9.96E-01	3.00E+00	7.85E+01	[24]
PE	Soln	1.2–1.5	-	9.97E-01	3.00E+00	8.85E+01	[24]
PE	Soln	7.4	0.3	1.30E-01	1.00E+00	1.00E+00	[54]
PMMA	Soln	1.2–1.5	2	0.5	7	1.00E-01	[55]
PMMA	Soln	1.3	-	0.45	13.1	10.7	[56]
PMMA	Soln	1.0–2.0	-	0.33	8	9.53E+01	[57]
PMMA	Soln	-	-	0.17	10	1700	[58]
PMMA	Soln	-	-	3.90E-01	2.00E+00	1.12E-04	[59]
PMMA	Soln	-	-	3.65E-01	2.00E+00	2.70E-03	[60]
PMMA	Soln	-	-	1.00E+00	7.04E+00	8.58E-01	[61]
PMMA	Soln	-	-	1.00E-01	5.00E-01	4.70E-01	[62]
PP	Soln	-	-	4.00E-02	2.00E+00	7.00E+00	[63]
PP	Melt	1.6	5	1.00E-01	8.00E-01	1.00E-05	[64]

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