

Supporting Information

Transport of Single-Walled Carbon Nanotubes in Porous Media: Filtration Mechanisms and Reversibility

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TABLE S1: Experimental conditions and calculated parameters for the SWNT column experiments

CaCl ₂ mM	KCl mM	KHCO ₃ mM	SRHA mg/L	Ionic strength	C/C _o	k _d	Attachment efficiency, α	Contact efficiency, η	Percent Released
Unfavorable conditions									
-	-	-	-	-	0.93	6.0x10 ⁻⁴	0.033	3.39x10 ⁻⁴	0
-	-	-	-	-	0.88	8.62x10 ⁻⁴	0.048	5.55x10 ⁻⁴	0
-	-	-	-	-	0.91	7.74x10 ⁻⁴	0.043	4.40x10 ⁻⁴	0
-	0.1	0.1	-	0.1	0.85	1.30x10 ⁻³	0.072	1.83x10 ⁻³	<1.0
-	0.1	0.1	-	0.1	0.87	1.06x10 ⁻³	0.059	6.20x10 ⁻⁴	<1.0
-	0.1	0.1	-	0.1	0.90	8.68x10 ⁻⁴	0.048	4.89x10 ⁻⁴	<1.0
-	0.3	0.1	-	0.3	0.82	1.55x10 ⁻³	0.085	8.65x10 ⁻⁴	1.30
-	1	0.1	-	1	0.76	2.20x10 ⁻³	0.122	1.23x10 ⁻³	12.67
-	1	0.1	-	1	0.82	1.55x10 ⁻³	0.086	8.69x10 ⁻⁴	5.41
-	3	0.1	-	3	0.78	1.93x10 ⁻³	0.107	1.10x10 ⁻³	15.39
-	3	0.1	-	3	0.79	1.81x10 ⁻³	0.100	1.03x10 ⁻³	11.06
-	10	0.1	-	10	0.22	1.17x10 ⁻²	0.645	6.74x10 ⁻³	11.47
-	10	0.1	-	10	0.25	1.09x10 ⁻²	0.603	6.14x10 ⁻³	15.39
1	7	0.1	-	10	0.10	1.77x10 ⁻²	0.981	1.83x10 ⁻³	1.55
-	10	0.1	5	10	0.45	6.14x10 ⁻³	0.339	3.53x10 ⁻³	20.50
1	7	0.1	5	10	0.70	2.82x10 ⁻³	0.156	4.14x10 ⁻⁵	1.09
1	7	0.1	5	10	0.65	3.47x10 ⁻³	0.192	1.94x10 ⁻³	2.30
-	30	0.1	-	30	0.09	1.93x10 ⁻²	1.068	1.09x10 ⁻²	9.28
0	30	0.1	-	30	0.11	1.76x10 ⁻²	0.973	9.83x10 ⁻³	13.38
-	55	0.1	-	55	0.09	1.89x10 ⁻²	1.044	1.03x10 ⁻²	37.16
Favorable conditions									
-	0.1	0.1	-	0.1	0.095	1.77x10 ⁻²	1	1.05x10 ⁻²	<1.0
-	10	0.1	-	10	0.085	1.84x10 ⁻²	1	1.09x10 ⁻²	<1.0

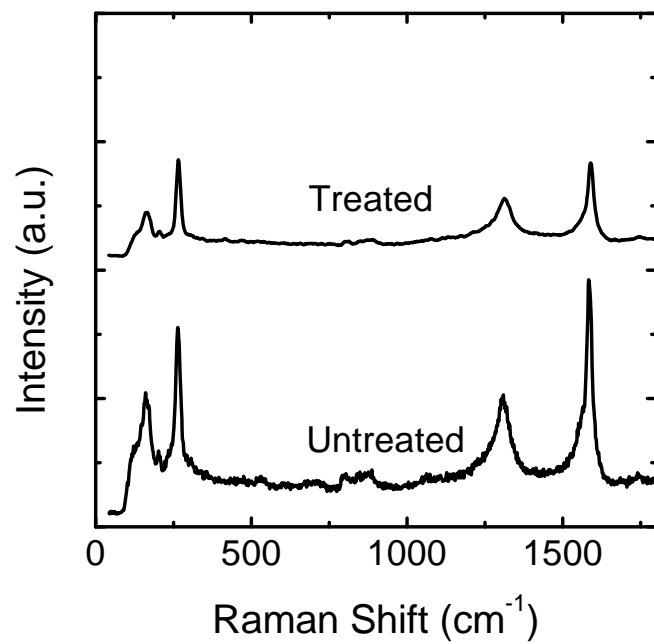


FIGURE S1. Raman spectra of untreated (as received) and treated (after two phases of sonication) SWNTs at 785 nm. The G:D ratio of the spectra decreased from 2.33 (untreated) to 0.51 (treated), suggesting defects induced by sonication treatment.

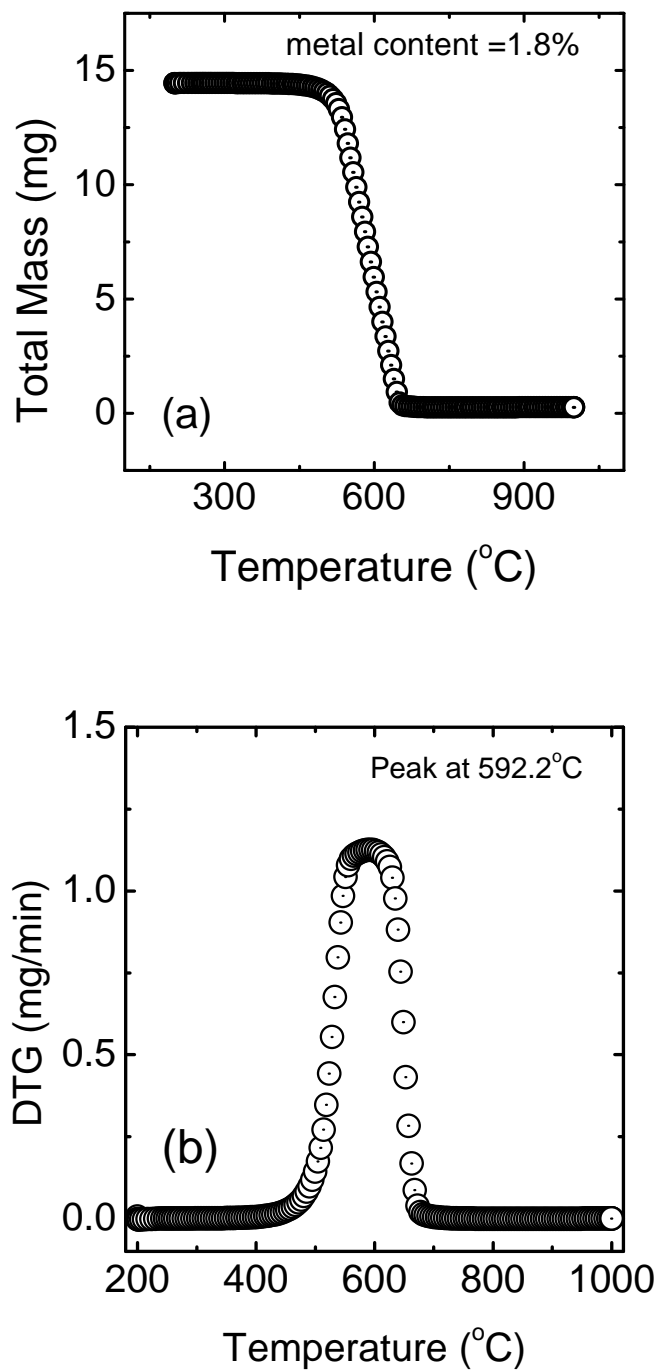


FIGURE S2. (a) TGA mass loss profile and (b) derivative profile of untreated SWNTs. The peak appears at 592.2 °C. The residual metal content was 1.8% after burning at 1000 °C and is considered to be a residual metal oxide catalyst.

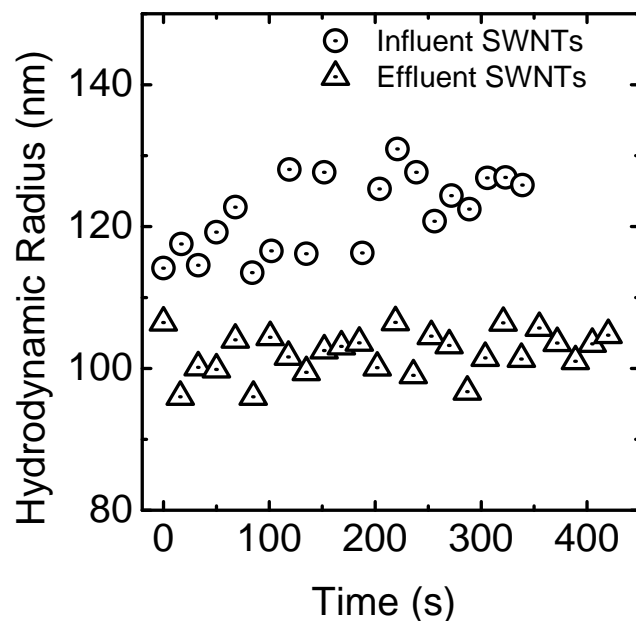


FIGURE S3. Aggregation of influent and effluent SWNTs in 0.1 mM KCl solution (Figure 2) presented as the change in the SWNT hydrodynamic radius as determined by dynamic light scattering (DLS) (ALV-500, Langen, Germany). The samples used in the column experiments were diluted (10 times) to have an appropriate mass concentration for the aggregation experiment. All experiments were performed at room temperature (22-23 °C) and pH 7 (adjusted by adding 0.1 mM KHCO₃ as a buffer).

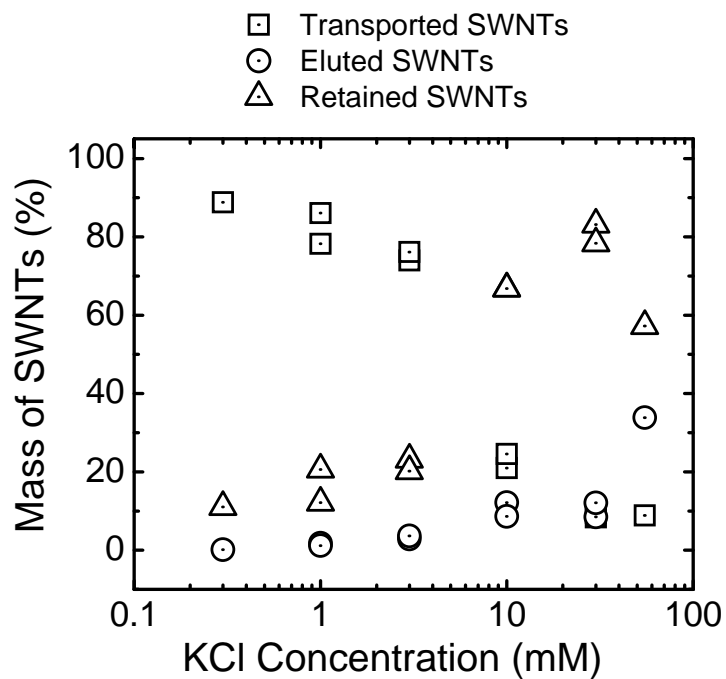


FIGURE S4. Percentage of influent SWNTs for the deposition experiments at various KCl concentrations that were: (i) transported through the column (Steps A and B in Figure 2), (ii) eluted with DI water (Step C in Figure 2), and (iii) remained retained in the column after elution.