

Supplementary Information

Mixtures of Oppositely Charged Polypeptides as High-performance Dispersing Agents for Single-wall Carbon Nanotubes

Gordon K.-C. Lee,^a Clare Sach,^a Malcolm L. H. Green,^a Luet-lok Wong^a and Christoph G. Salzmann^{*b}

^a University of Oxford, Department of Chemistry, Inorganic Chemistry Laboratory, South Parks Road, Oxford OX1 3QR, United Kingdom.

^b Durham University, Department of Chemistry, South Road, Durham DH1 3LE, United Kingdom. Fax: (+44) 191 33 42051; Tel: (+44) 191 33 42020;

E-mail: c.g.salzmann@durham.ac.uk

Contents

1. Characterisation of the dispersions
2. Supplementary figures

1. Characterisation of the dispersions

Raman spectra of the dispersions were recorded in quartz capillaries using a Labram 1B Jobin Yvon spectrometer (20 mW HeNe laser, 632.8 nm), equipped with an Olympus microscope, through a 10 fold magnification objective.

A Digital Instruments Multimode SPM atomic force microscope (AFM) was used with a Nanoscope IIIa controller, operating in tapping mode with an 'E' scanner. Silicon probes (Nascatec GmbH model NST-NCHFR), with resonant frequencies of approximately 320 kHz were used. The SWCNT dispersions were dropped onto freshly cleaved mica surfaces using a Laurell Technologies WS-400 spin-coater (8000 rpm).

Zeta potential measurements were conducted in capillary cells using a Malvern Zetasizer Nano ZS.

Optical absorbance spectra of the dispersions in D₂O were recorded on a Perkin Elmer Lambda 900 spectrometer.

2. Supplementary figures

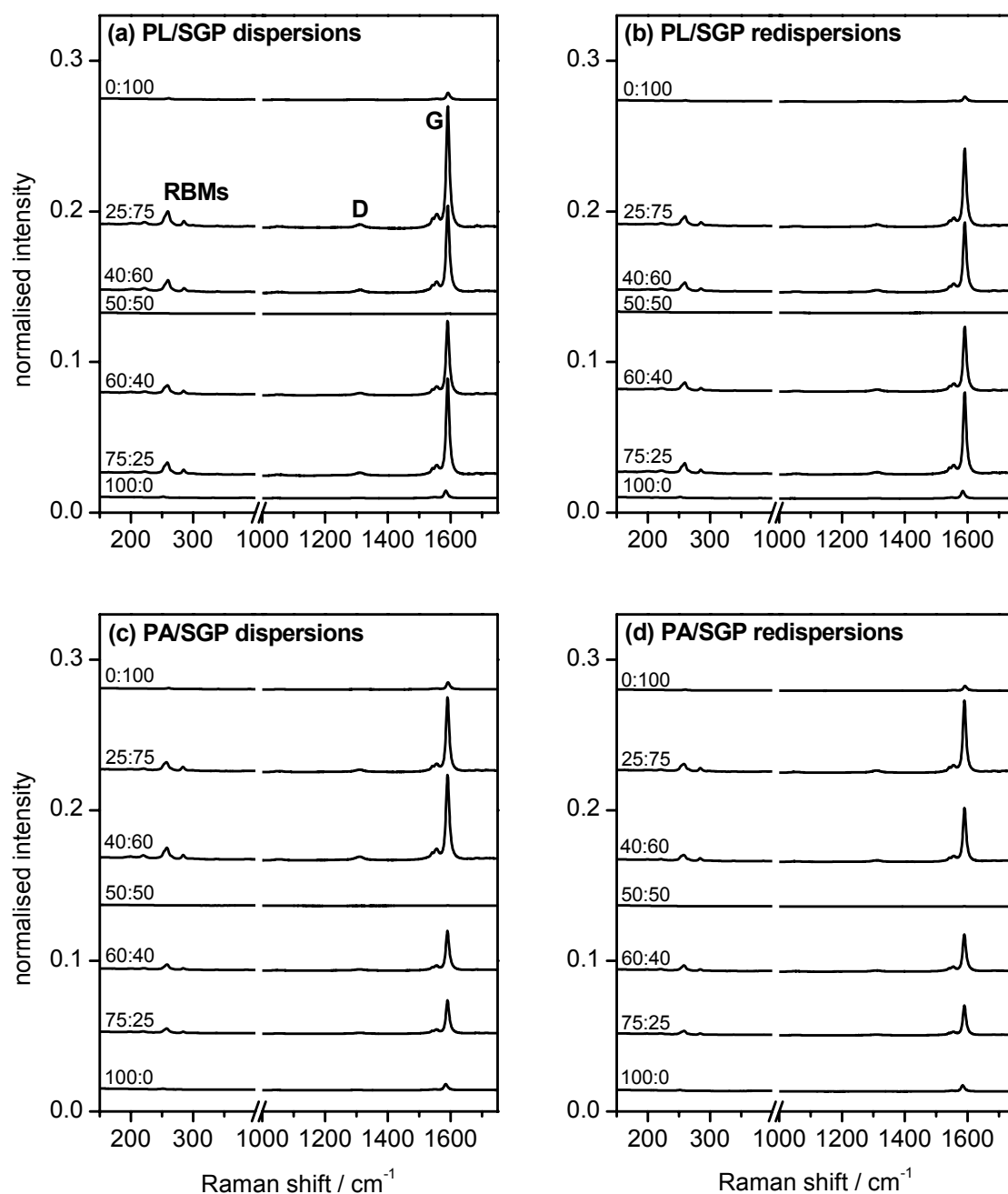


Fig. S1. Raman spectra ($\lambda_0 = 632.8 \text{ nm}$) of the SWCNT dispersions and redispersions. The spectra have been normalized with respect to the area of the $\nu(\text{O-H})$ peak as described in ref. 7 and have been shifted vertically for clarity. The spectral regions of the radial breathing modes (RBMs), the D-band and the G-band are indicated in panel (a). The molar fractions of the amino acid groups are given for each spectrum.

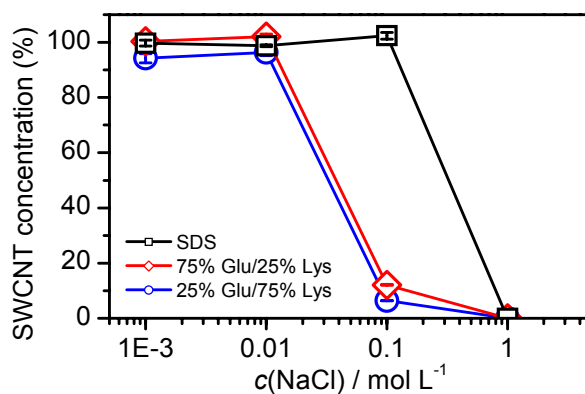


Fig. S2. Stability of the SWCNT dispersions upon addition of NaCl solution. 500 μL of the SWCNT dispersions were combined with 500 μL of the NaCl solutions. The mixtures were allowed to stand for about one hour before passing through glass wool for Raman spectroscopic analysis. The dispersing agents were SDS (squares), 75% Glu/25% Lys (diamonds) and 25% Glu/25% Lys (circles). The SWCNT concentrations are given as percentages of the initially prepared dispersions and the NaCl concentrations after combining with the dispersions.

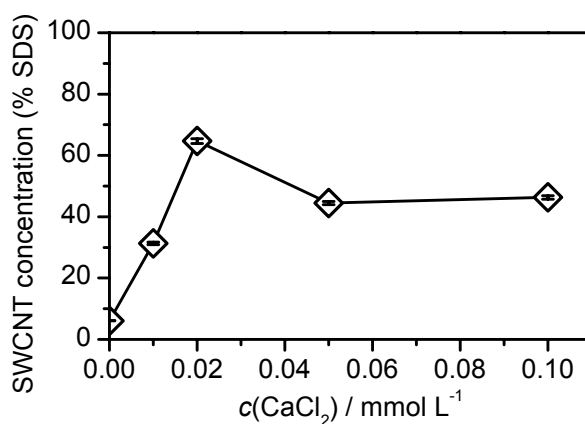


Fig. S3. SWCNT concentrations as a function of the CaCl_2 concentration in dispersions containing sodium polyglutamate (5 mM Glu).