Supporting Information

Thermoresponsive Amphiphilic Functionalization of Thermally Reduced Graphene Oxide to Study Graphene/Bacteria Hydrophobic Interactions

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1. Results and discussion

PEG-G-PNIPAM was synthesized to investigate the hydrophobic interactions between graphene sheets and the bacteria. All compounds were characterized by IR, elemental analysis, NMR, TGA, Raman spectroscopy, DLS and Cryo-TEM.

2. Elemental analysis and calculations of the number of functional groups

Table S1. Element analysis of the polyethylene glycol derivatives and functionalized graphene sheets.

Sample	Experimental			Calculated		
	C (%)	H (%)	N (%)	C (%)	H (%)	N (%)
PEG	52.25	10.51	0.00	53.4	9.00	0.00
PEG-Trz	54.84	8.90	1.68	51.39	8.33	1.95
PEG-Trz-Ea	53.13	8.92	2.22	51.92	8.51	2.58
PEG-Trz-Ea(N_3)	52.89	8.50	3.15	52.44	8.60	4.49
PEG-G	53.55	8.43	2.41			
PEG-*G*-PNIPAM	60.29	9.44	11.11			

a) PEG-G building block

Calculation of the number of carbon atom conjugated to one PEG-Trz-OH(N) based on the nitrogen content (2.41%) of the PEG-G

100 / X = 2.41 / 70; X = 2904.56 (the molecular weight of the PEG-G building block)

Molecular weight of PEG-Trz-OH(N) group is 2150, therefore the carbon atom number which one PEG-Trz-OH(N) is conjugated can be calculated as below:

2904.56 – 2150 = 754.56 / 12 = 62 number of carbon atoms per one one PEG-Trz-OH(N) group.

3. Nuclear Magnetic Resonance

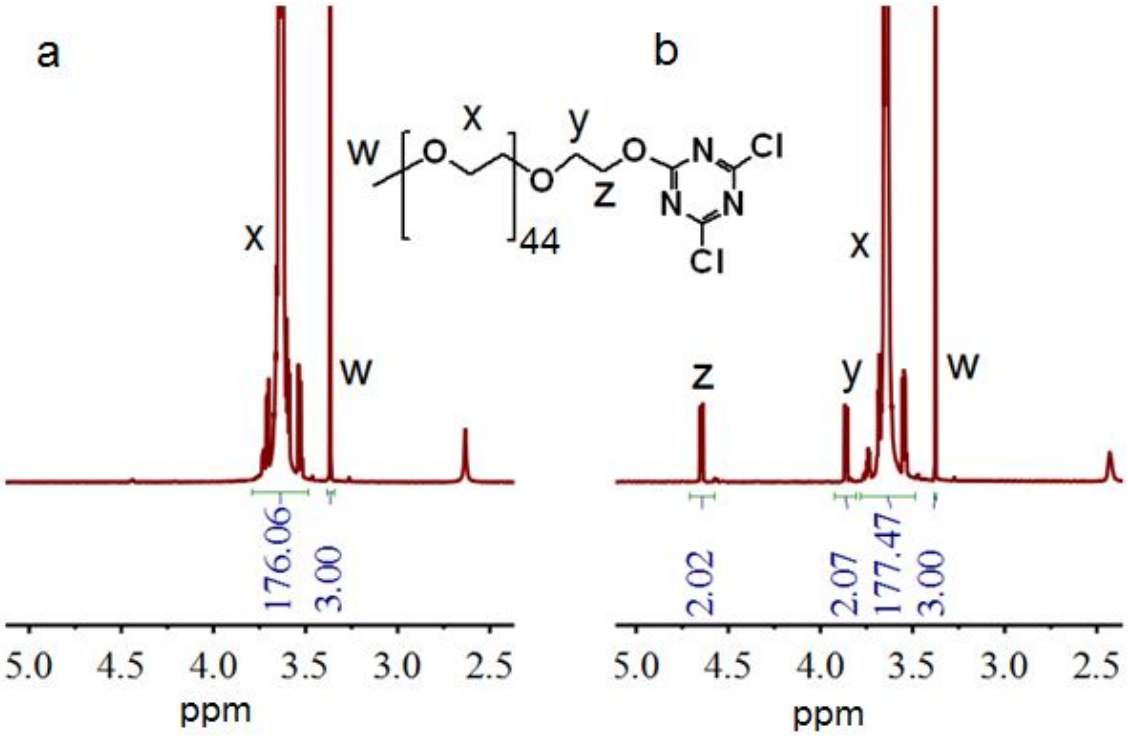


Figure S1. ^{1}H-NMR spectra: (a) PEG and (b) PEG-Trz (700 MHz, $CDCl_3$).

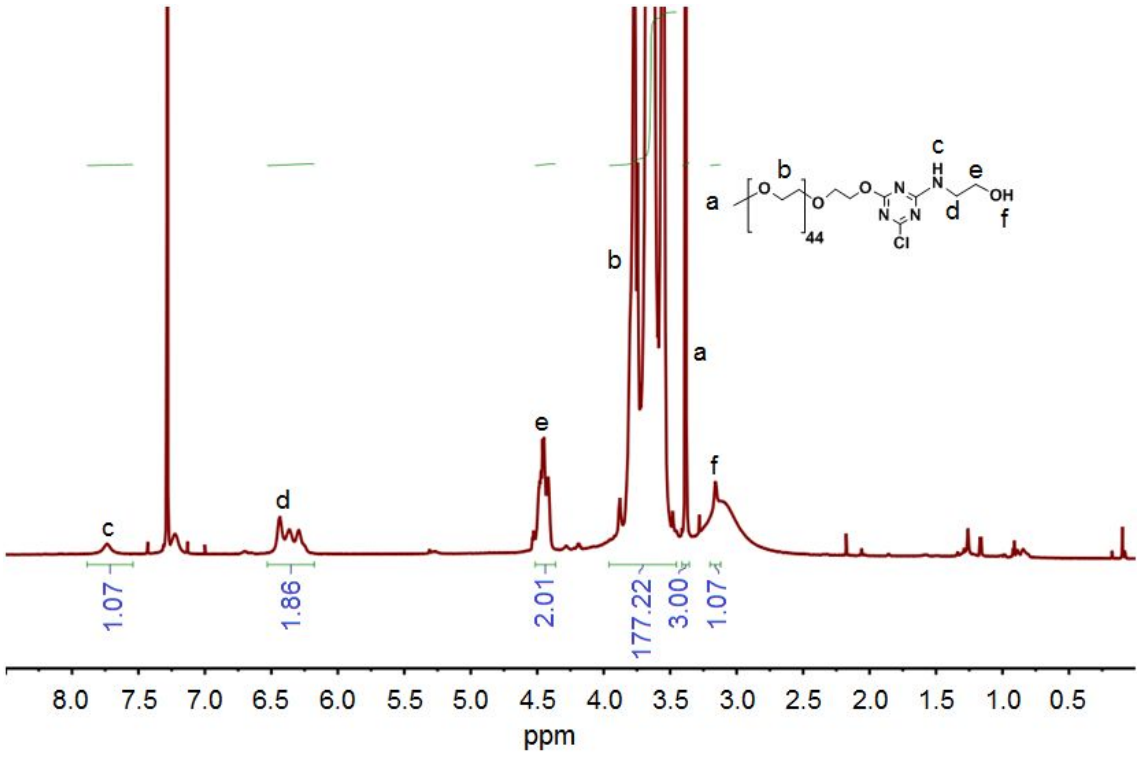
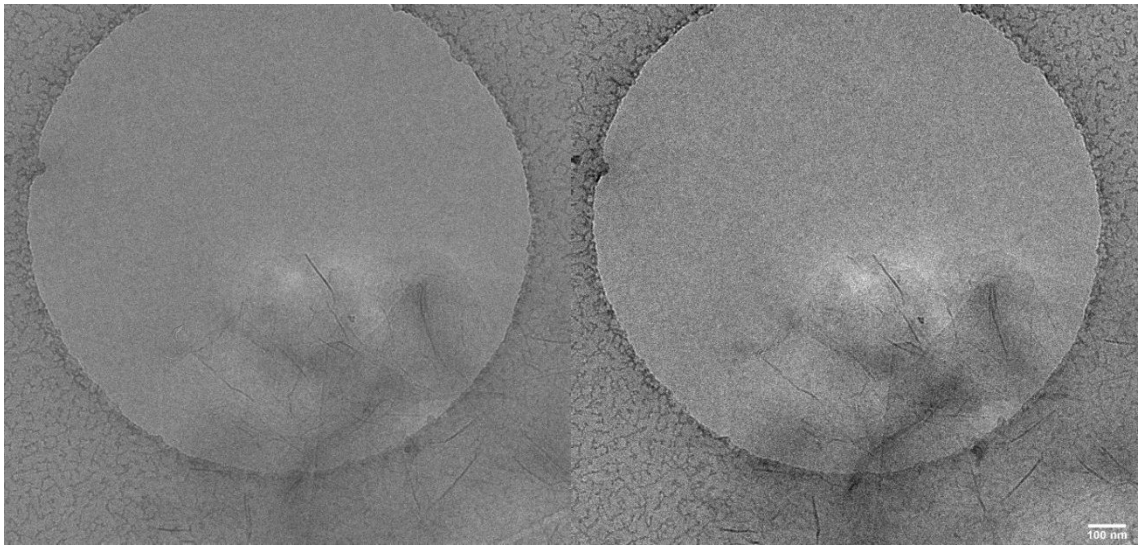


Figure S2. ^{1}H-NMR spectrum of PEG-Trz-OH (700 MHz, $CDCl_3$).

4. Cryo-TEM studies

A



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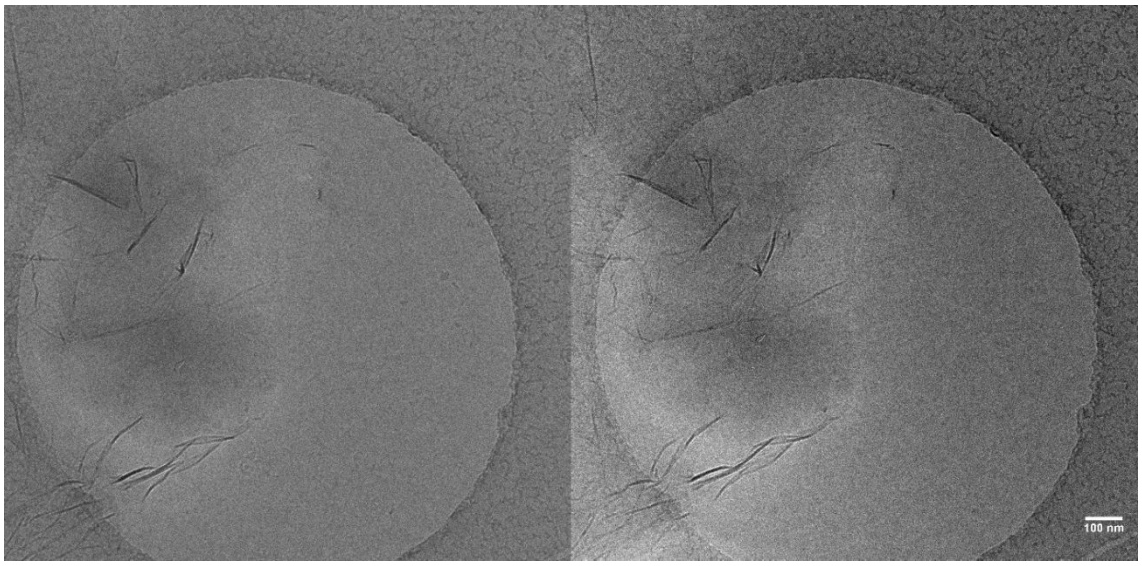
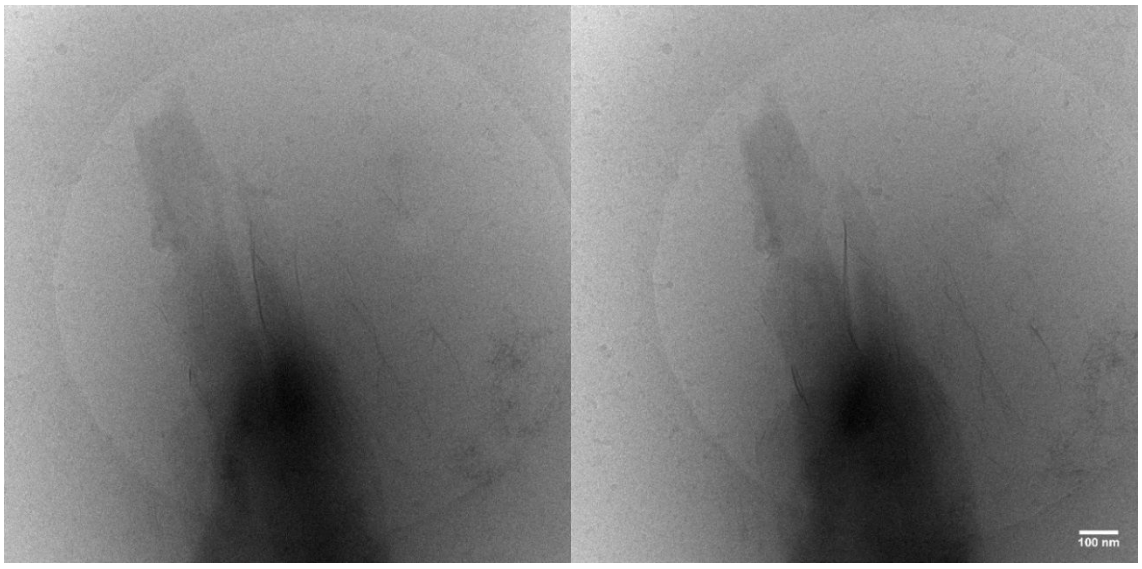


C



D

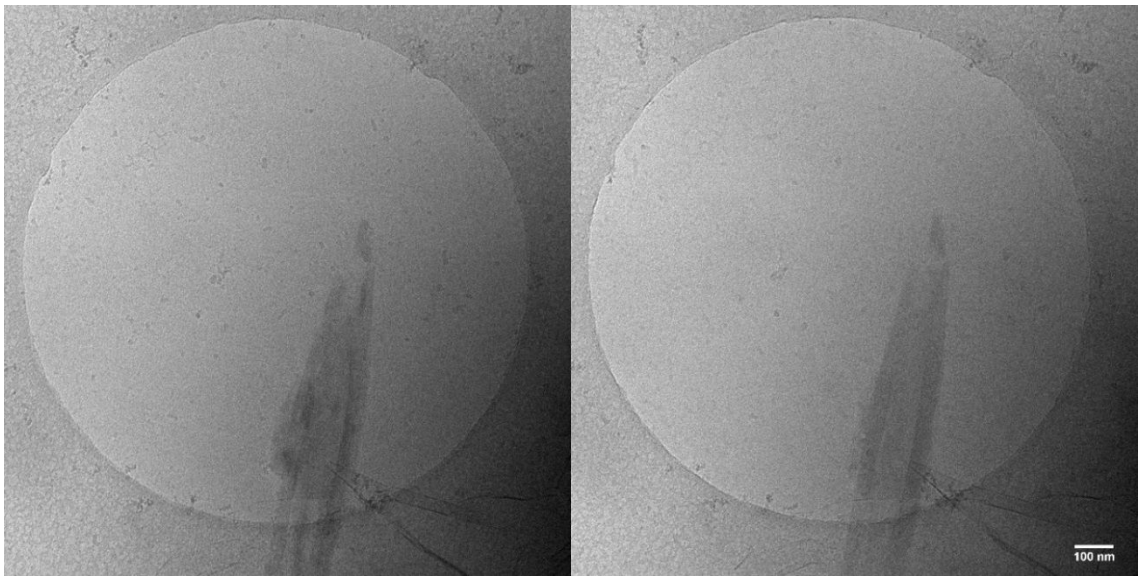


Figure S3. Cryo-TEM of PEG-G-PNIPAM (side-by-side stereograms): In order to provide a more spatial impression of the functionalized graphen sheets the same image sections like in Figure 2 d-g were recorded at two different angles (4° and -4°) by tilting the compuStage of the microscope. To generate stereograms, the two recorded images were aligned using the software StereoPhoto Maker (Masuji Suto, Japan). (A, B) PEG-G-PNIPAM at room temperature, (C, D) PEG-G-PNIPAM above LCST.