Electronic Supplementary Information

Preparation of Graphene Oxide by Cyanuric Chloride as an Effective and Non-Corrosive Oxidizing Agent

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General

Chemicals: cyanuric chloride was purchased from Across Organics (Geel, Belgium). Graphite was purchased from Merck, toluene, tetrahydrofuran were purchased from Sigma-Aldrich (Schnelldorf, Germany).

Fourier transform infrared spectroscopy (FT-IR): IR spectra were recorded using a JASCO spectrometer. An ultrasonic bath (Model: SONOREX, RK255 HZ, Made in Germany) was used to disperse materials in solvents.

Thermal gravimetric analysis (TGA): TGA measurements were recorded by a STA 409 apparatus (Linseis) at temperatures ranging from 25-800 ºC with a 5 ºC/min heating rate under argon gas.

Elemental analysis: Elemental analysis was performed using ELEMENTAR apparatus with three columns and detector for carbon, nitrogen, hydrogen and sulfur elements.

Raman Spectroscopy: Raman spectra were recorded with a BRUKER SENTERRA (2009) from with Spectral Range: 200-3500cm^{-1} and Laser wavenumber: 785nm and Confocal Depth Resolution: 2μm and Spectral Resolution: < 3cm^{-1}.

Atomic force microscopy (AFM): Atomic force microscopy was performed using a BRUKER MULTIMODE 8 machine operating in tapping mode in air, with samples dispersed on mica

substrates. MPP probe tips from BRUKER were used to acquire all images. Analysis of AFM data, including particle count analysis, was performed with the BRUKER NANOSCOPE ANALYSIS software (version 1.50)

X-ray photoelectron spectroscopy (XPS): XP spectra were recorded on a Kratos Axis Ultra DLD spectrometer using a monochromated Al Kα X-ray source at an analyzer pass energy of 80 eV for survey spectra and 20 eV for high-resolution core-level spectra which were recorded in FAT (fixed analyser transmission) mode. The electron emission angle was 60° and the source-to-analyzer angle was 60°. The binding energy scale of the instrument was calibrated following a Kratos Analytical procedure which uses ISO 15472 binding energy data. Spectra were recorded by setting the instrument to the hybrid lens mode and the slot mode providing approximately a 300 x 700 μm^2 analysis area. Charge neutralization had been used. All XPS spectra were processed with the UNIFIT program (version 2017). A Gaussian/Lorentzian sum function peak shape model GL (30) was used in combination with a Shirley background. If not otherwise denoted the L-G mixing for component peaks in all spectra were constrained to be identical. Peak fitting of C1s spectra was performed by using an asymmetric peak shape model for the graphene C1s component. After peak fitting of the C1s spectra, all the spectra were calibrated in reference to the graphene C1s component at a binding energy of 284.6 eV (static charge reference). Gold substrates for the XPS analysis were cleaned in a piranha solution (1:4) 30% H_2O_2: 98% H_2SO_4 (v/v) during ultrasonication at room temperature for 10 minutes. Then they were washed with the DI water 5 times and with acetone 2 times. After drying 12 hours the studied compounds were dissolved in methanol and dropwise evenly distributed over the surface of gold substrates.

Synthesis

(Graphite (0.1 g, 0.008 mol) dispersed in toluene (10 mL). Then cyanuric chloride (0.008 mol, 1.5 g) was dissolved in THF (40 mL) and added to the mixture. The reaction mixture was stirred at 80° C for 4 days under reflux. The toluene solvent let us increase the boiling point of THF. After each 24 h period the mixture was sonicated for 10 minutes and about 5 mL (necessary volume) of THF was added to the reaction again. At the end of the reaction the mixture was purified by centrifugation (the product constantly dispersed in THF and centrifuged 5 times at 6000 r/s for 10 minutes). After the reaction the weight of the product was increased by 0.02 g).

Table S1. Elemental analysis of GO synthesized by Hummers' method according to data in reference 13 in the main text.

Compound	**N (wt.%)**	**C (wt.%)**	**H (wt.%)**	**O (wt %)**
Graphene oxide (Literature[13])	Not Recorded	55	Not Recorded	30

Table S2. Interpretation of the fitted components in the highly resolved XPS spectra.

Sample	Spectrum	Binding energy	L-G Mixing	FWHM	Interpretation	Relat. Area	Abs. Area
Graphite	C 1s	284.6	0.49	0.58	C-C sp^2	0.92	36962
		285.7	0.49	0.87	C-O	0.03	1258
		286.6	0.49	0.87	C*-O-C(=O)	0.02	840
		290.9	0.49	0.98	π-π* shake up	0.02	667
		292.0	0.49	0.98	π-π* shake up	0.01	463
GO	C1s	284.6	0.23	1.74	C-C sp^2	0.56	15822
		286.1	0.23	1.74	C-O/ C=O	0.25	7021
		287.1	0.23	1.74	O-C=O	0.13	3593
		288.7	0.23	1.74	π-π* shake up	0.05	1550
		290.7	0.23	1.74		0.01	508
	O1s	531.7	0.11	1.29	C-O	0.38	5921
		532.9	0.11	1.55	C-OH	0.27	4262
		534.1	0.11	1.55	O-C-Cl	0.17	2685
		535.1	0.11	1.55	C=O	0.13	2072
		536.2	0.11	1.55	O-C=O	0.04	563