Electronic Supplementary Information

Hydropathy: the controlling factor behind inhibition of Aß fibrillation by graphene oxide

Sudipta Bag[a], Ayantika Sett[b], Sunando DasGupta[b], Swagata Dasgupta[a]*

[a]Department of Chemistry, Indian Institute of Technology Kharagpur, Kharagpur 721302, India

[b]Department of Chemical Engineering, Indian Institute of Technology Kharagpur, Kharagpur 721302, India

*Corresponding Author:

Professor Swagata Dasgupta

Department of Chemistry

Indian Institute of Technology, Kharagpur-721302, India

Tel.: +91-3222-283306

Email: swagata@chem.iitkgp.ernet.in

Synthesis and characterisation techniques of graphene oxide

Synthesis of graphene oxide

Graphene oxide was synthesised following Hummer's method with slight modifications.[S1,S2] In brief, 50 ml concentrated H_2SO_4 was taken in a 500 ml conical flask and placed in an ice bath to bring its temperature to 0 °C. 1 g graphite powder and 1 g $NaNO_3$ were ground together and added to the precooled H_2SO_4 solution with continuous stirring. The mixture was stirred for 30 min in an ice bath. $KMnO_4$ was added to this mixture very slowly with continuous stirring and the temperature of the system was maintained at 0-4 °C. After complete addition of permanganate, double distilled water (100 ml) was added to the reaction mixture and stirring was continued for 2h. Hot water (100 ml) was poured into the system and the whole mixture was stirred at 95 °C for another 2 h. Then 20 ml 30% hydrogen peroxide was added leading to the formation of brownish yellow graphene oxide (GO). GO was purified by washing with 5% HCl and then with ultrapure water. The pH of the solution should reach 7.0 from the acidic value. The prepared GO was washed several times with water by centrifugation and the GO pellet obtained was then dried and characterised.

Characterisation of prepared GO

UV-vis spectroscopy

The solid GO was dissolved in water and sonicated for several hours. The UV-vis spectrum of the brownish yellow GO solution was recorded in a Shimadzu UV-1800 UV-vis spectrophotometer. The scan range was kept as (200-800) nm and a quartz cuvette of path length

1 cm used for the measurement. The spectrum was corrected with respect to its corresponding control.

Fourier transform infrared (FTIR) spectroscopy

An FTIR spectrum of the powdered graphene oxide was obtained by the KBr pellet method using a Perkin Elmer RX1 spectrometer scanned in the wavelength region (400-4000) cm^{-1}.

Powder X-ray diffraction

The X-ray diffraction pattern of GO was acquired using a Bruker D8 XRD advance unit. Cu K_α radiation (λ=1.5406 Å, 40kV) was used as the X-ray source and the scan range was fixed at 0°-100° at the scan rate of 0.075° per step.

Atomic force microscopy (AFM)

Morphology of the GO was checked using AFM. Sample preparation and instrumental specifications are as provided in Materials and methods section of the main article.

References

[S1] W. S. Hummers and R. E. Offeman, *J. Am. Chem. Soc.,* 1958, **80**, 1339.

[S2] I. Roy, D. Rana, G. Sarkar, A. Bhattacharyya, N. R. Saha, S. Mondal, S. Pattanayak, S. Chattopadhya and D. Chattopadhyay, *RSC Adv.,* 2015, **5**, 25357.

Characterisation of graphene oxide

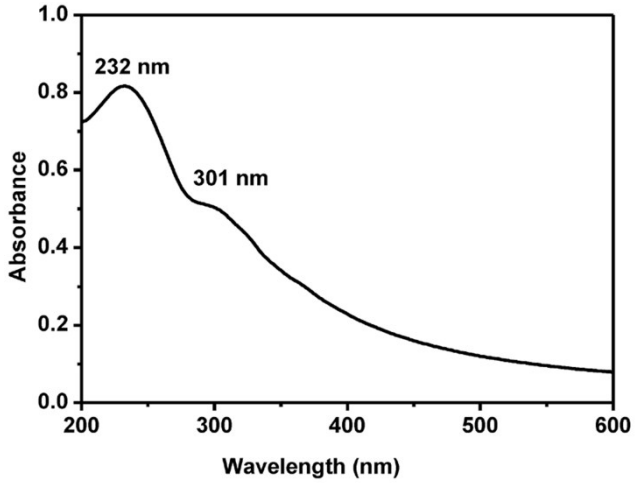

Figure S1. UV-vis spectrum of prepared GO in water.

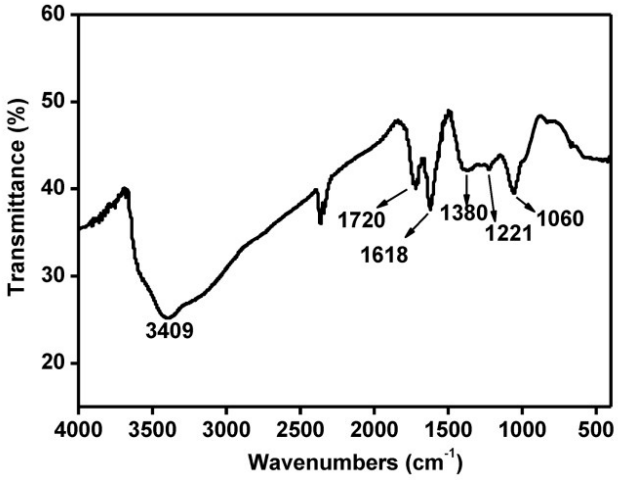

Figure S2. FTIR spectrum of prepared solid GO powder in KBr.

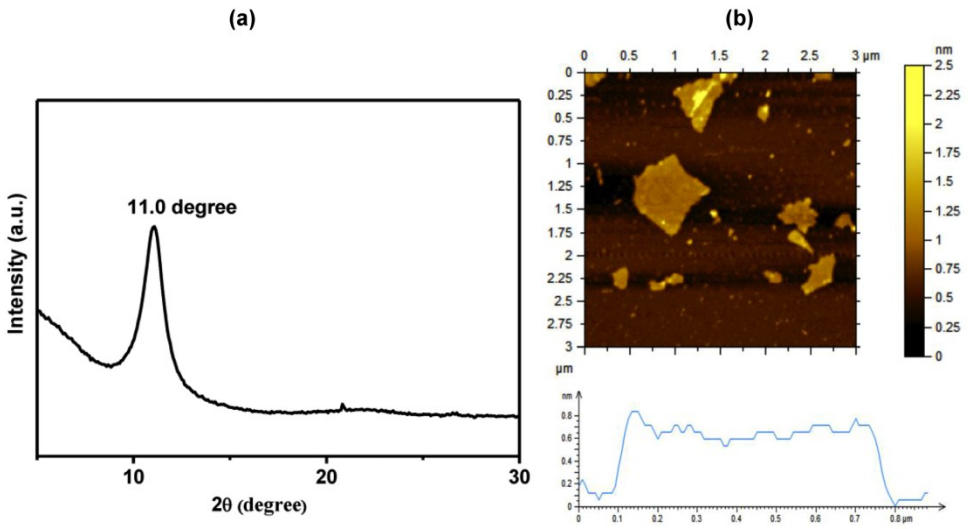

Figure S3. Structural aspects, morphology and height determination of solid GO (a) X-ray diffraction pattern and (b) AFM image with height profile of GO flakes.