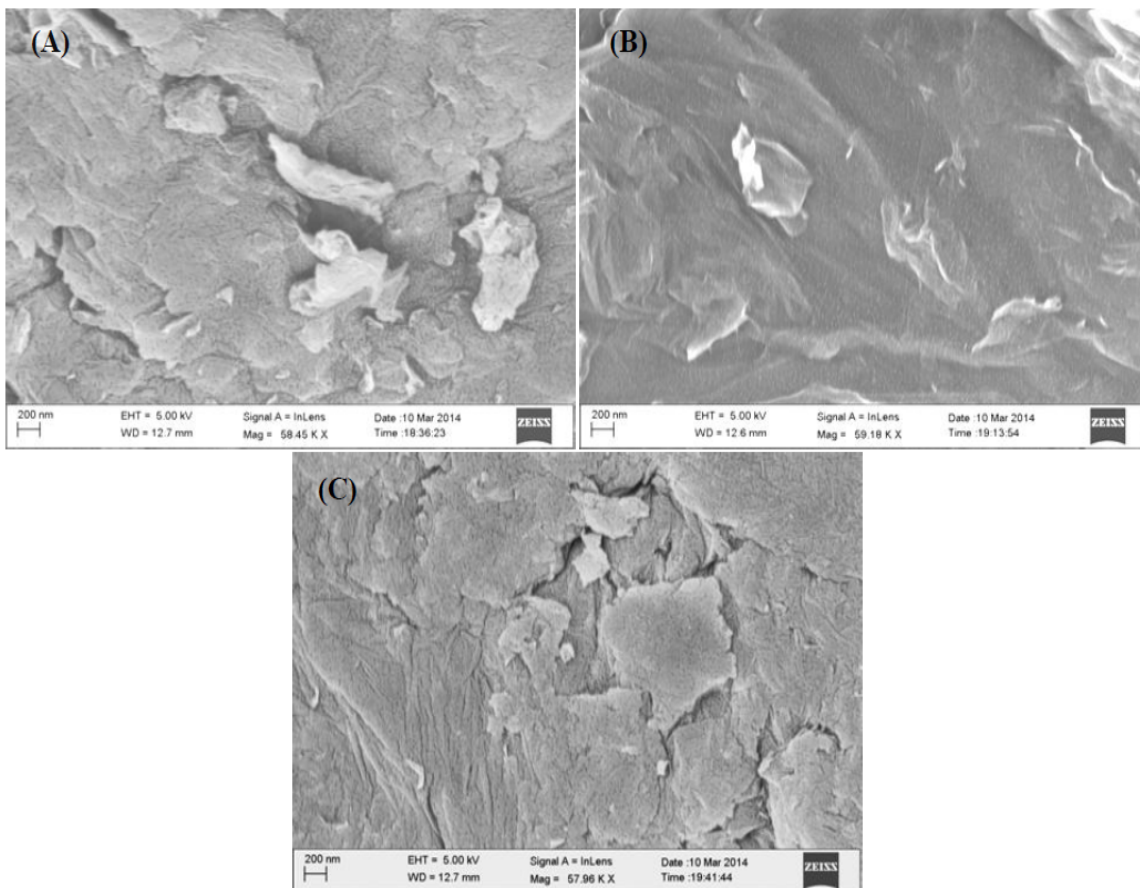


**Supplementary information for**

**Role of graphite precursor and sodium nitrate in graphite oxide synthesis:**

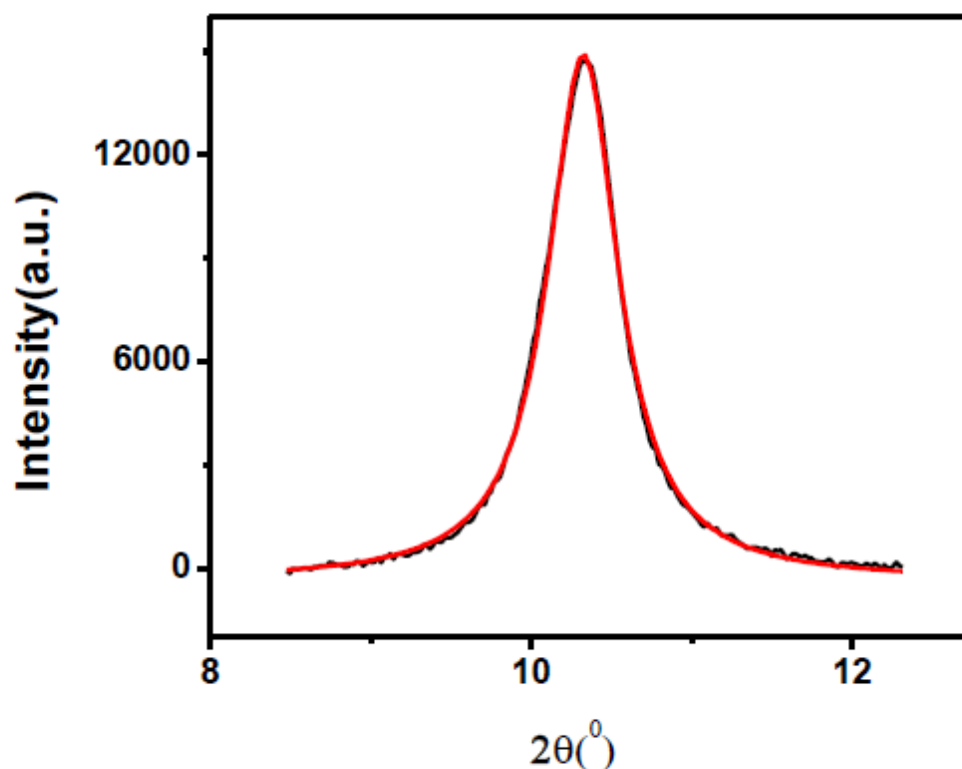
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**Fig. SI 1:** SEM images of GO Samples. (A) GO (20) (B) GO (45) (C) GO (150).

## XRD Analysis using Scherrer equation



**Fig. SI 2:** Figure shows XRD peak fitting for GO (45) using lorentzian equation. Black line and red lines are experimental data and lorentzian fitting respectively.

### Determination of d:

From Bragg's Law

$$n\lambda = 2d\sin\Theta$$

n is an integer

$\lambda$  = wavelength of the incident light

d = interlayer distance

$\Theta$  = the angle between the incident ray and the scattering planes

Using, n = 1,  $\lambda = 1.54 \text{ \AA}$ ,  $2\Theta = 10.507$ ,  $\Theta = 5.2535$

$$\text{So, } d = \frac{1.54}{2 * \sin(5.2535)} = 8.41 \text{ \AA}$$

### Determination of $L_c$ and N:

From Scherrer formula,

$$L_c = (K\lambda) / (\beta \cdot \cos\Theta)$$

$L_c$  = mean crystallite length along c-axis

K = dimensionless shape factor, typical value is **0.9** for  $L_c$ .<sup>1</sup>

$\beta$  = line broadening at full width half peak maxima in radian =  $9.07 \times 10^{-3}$

$\beta$  was determined by lorentzian fitting

$$\theta = 5.25^\circ$$

$$\lambda = 0.154 \text{ nm}$$

$$\text{Hence, } L_c = (0.90 \times 0.154) / (9.07 \times 10^{-3} \times \cos(5.25))$$

$$\mathbf{L_c = 15.4 \text{ nm or } 154 \text{ \AA}}$$

$$N = (L_c \times 10) / d$$

N = Number of layers

The factor 10 is the conversion factor from nm to  $\text{\AA}$ .

$$N = (15.4 \times 10) / 8.41$$

$$\mathbf{N = 18.25 \sim 18}$$

### Determination of $L_a$

$$L_a = (K\lambda) / (\beta \cdot \cos\Theta)$$

$L_a$  = mean crystallite length along a-axis of crystallite

K = dimensionless shape factor, typical value is **1.84** for  $L_a$ .<sup>2</sup>

$\beta$  = line broadening at full width half peak maxima in radian =  $11.9 \times 10^{-3}$

$\beta$  was determined by lorentzian fitting

$$\theta = 21.2^\circ$$

$$\lambda = 0.154 \text{ nm}$$

$$\text{Hence, } L_a = (1.84 \times 0.154) / (11.9 \times 10^{-3} \times \cos(21.2))$$

$$\mathbf{L_a = 25.4 \text{ nm or } 254 \text{ \AA}}$$

**Table S1:** Particle size of graphite after sonication

<b>Graphite Particle Size</b>	<b>Graphite particle size after sonication</b>
150 $\mu\text{m}$	101 $\pm$ 36
45 $\mu\text{m}$	7.5 $\pm$ 1.9
20 $\mu\text{m}$	5.3 $\pm$ 1.5

Particle size of graphite precursors were determined by Optical Microscope (LEICA DM 2500P and LEICA EZ4) after sonication step in the synthesis. The total magnification was 20X.

### **References:**

1. D. W. Lee, L. De Los Santos V, J. W. Seo, L. L. Felix, A. Bustamante D, J. M. Cole and C. H. W. Barnes, *J. Phys. Chem. B*, 2010, **114**, 5723-5728.
2. L. G. Cançado, K. Takai, T. Enoki, M. Endo, Y. A. Kim, H. Mizusaki, A. Jorio, L. N. Coelho, R. Magalhães-Paniago and M. A. Pimenta, *Appl. Phys. Lett.*, 2006, **88**, 163106.