

Supplementary Materials

Magnetic Properties in Nitrogen-Doped Graphene Governed by Dopant Configurations

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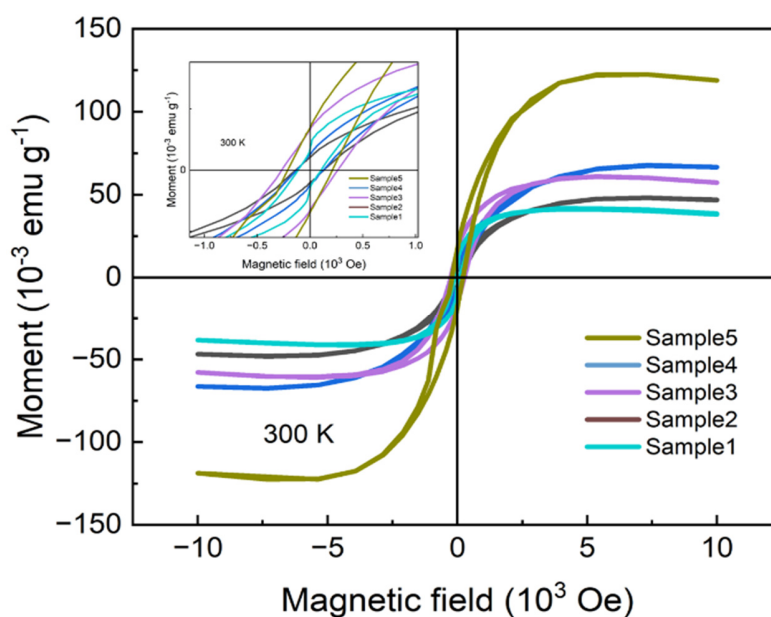


Figure S1. M-H curves measured for different NG samples with synthesis parameters shown in Table S1.

Figure S1 shows room temperature magnetization M-H curves of annealed NG-500 and NG-600 samples, along with S2 samples, which was discussed in the main text because of the enhanced magnetization. The annealing of NG-500 and NG-600 resulted in deterioration of magnetic saturation compared to the S2 sample.

Table S1. Parameters used for the optimization of NG materials during the two-step synthesis.

Sample	Input parameters		Output parameters		
	Synthesis temperature (°C)	Annealing temperature (°C)	Saturation magnetization (emu g ⁻¹)	Coercivity (Oe)	Remanance (emu g ⁻¹)
Sample 0 / (S1)	400	-	0.003	40	0.0002
Sample 1	500	700	0.039	134.48	0.0060
Sample 2	500	650	0.048	110.44	0.0050
Sample 3	600	800	0.057	269.75	0.0080
Sample 4	600	700	0.068	125.32	0.0060
Sample 5 / (S2)	400	600	0.130	235.87	0.0100

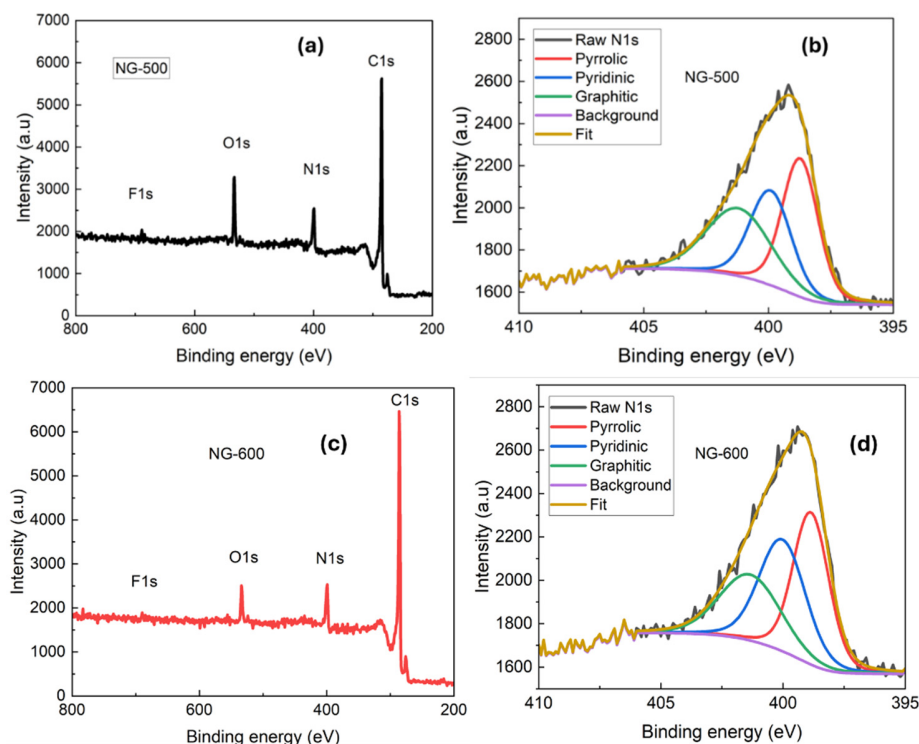


Figure S2. (a) Survey spectrum of NG-500 (b) High resolution of N1s spectra of NG-500 (c) Survey spectrum of NG-600 (d) High resolution of N1s spectra for NG-600

NG-500 and NG-600 refer to samples that did not undergo annealing. The survey spectra in Figure S2(a) and (c) show a decrease in nitrogen, oxygen, and fluorine content with increasing reaction temperature from 500 °C to 600 °C. The N 1s spectra in Figure S2(b) and (d) further indicate that pyrrolic-N is the dominant configuration in both samples.

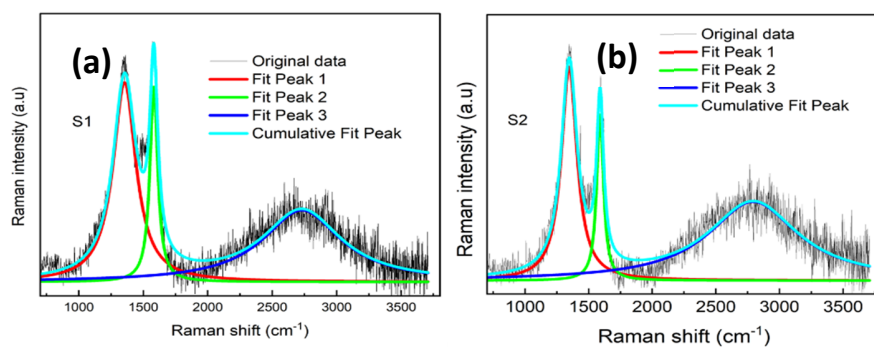


Figure S3. The deconvoluted Raman spectra for (a) S1, (b) S2

To determine the I_D/I_G ratio, the Raman spectra of S1 and S2 were fitted using three Lorentzian peaks centered at ~ 1352 cm^{-1} (D band), ~ 1589 cm^{-1} (G band), and ~ 2749 cm^{-1} (2D band). The corresponding fitted spectra are shown in Figure S3(a) and (b). The quality of the fits was high, with adjusted R^2 values of ~ 0.97 or greater.