

Supporting information for Ball Milling: A Green Mechanochemical Approach for Synthesis of Nitrogen Doped Carbon Nanoparticles

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FigS1: Mass fabrication of ORR catalyst (unit of the ruler is millimeter).

The photo in FigS1 demonstrates that ball milling could be used to fabricate gram-scale nitrogen doped catalyst for ORR.

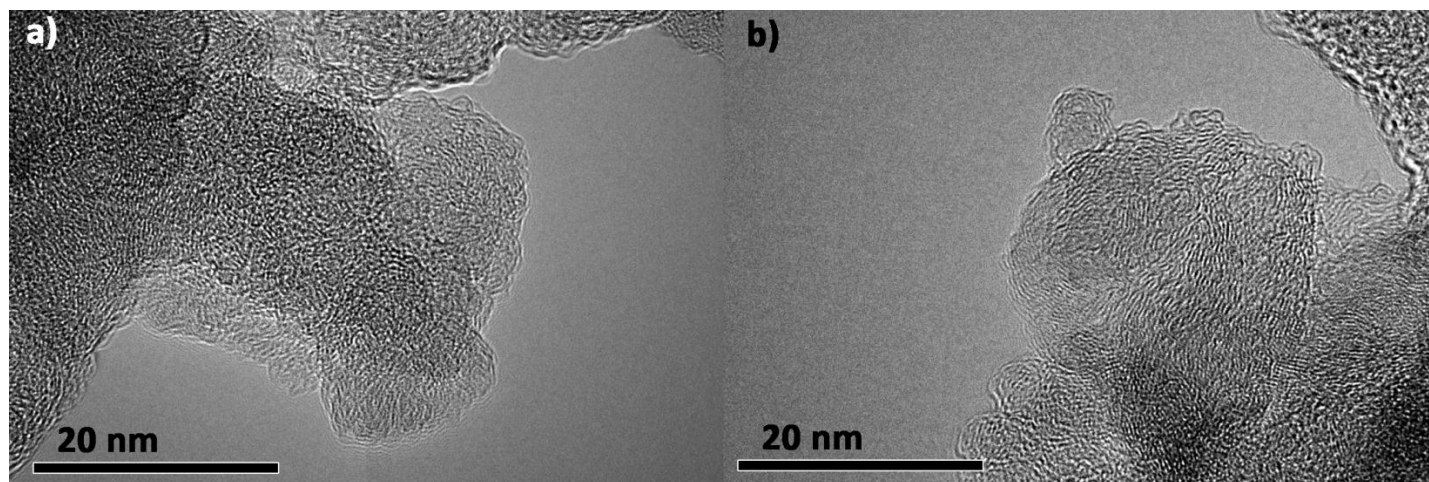
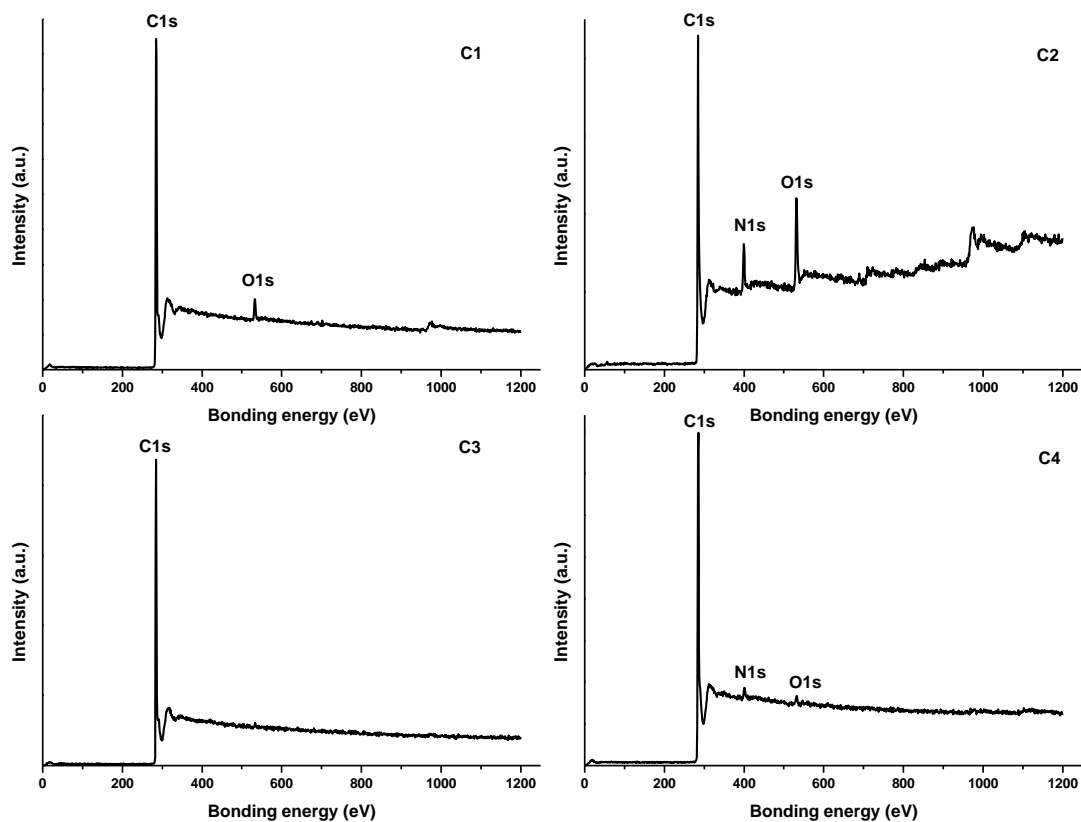


Fig. S2. TEM bright field images of a) C_2 and b) C_4 . It shows the fine structure of the nano-particles.



FigS3. XPS survey of C1-C4.

The XPS survey is shown in FigS2. In the starting commercial graphite, there was about 2.2% oxygen. After ball milling, the nitrogen peak appeared with an increase of intensity of oxygen peak. The nitrogen was introduced by the ball milling while the oxygen could be introduced when the sample was exposed in the atmosphere before taking the spectrum. The nitrogen and oxygen content dropped after annealing. Besides, the direct annealing of commercial graphite didn't introduce any detectable nitrogen doping, but removed the oxygen in the commercial graphite.

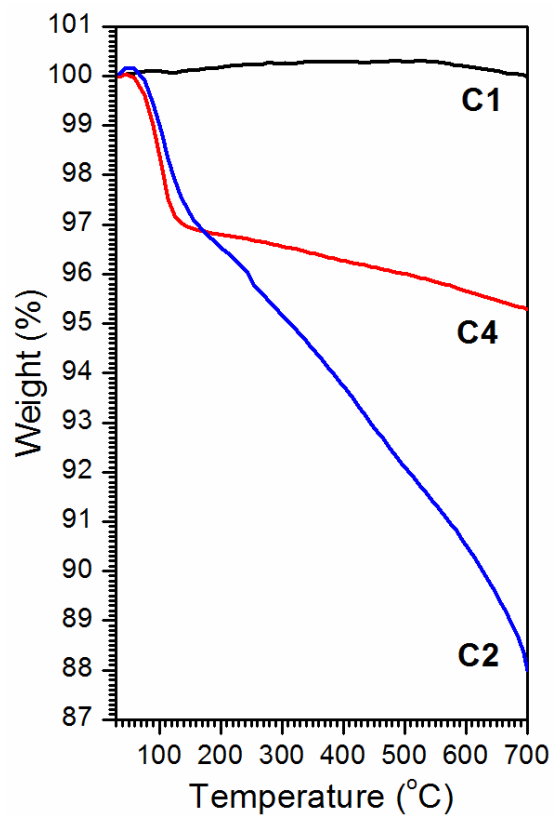


Fig S4 TGA of the ball milled graphite (C2) in N₂/15%H₂ mixture.

Fig S4 shows the thermo gravimetric analysis (TGA) of the ball milled graphite. The heating process was programmed the same as the annealing process.