

## Tow-step Process for Programmable Removal of Oxygen Functionality of Graphene Oxide: Functional, Structural and Electrical Characteristics

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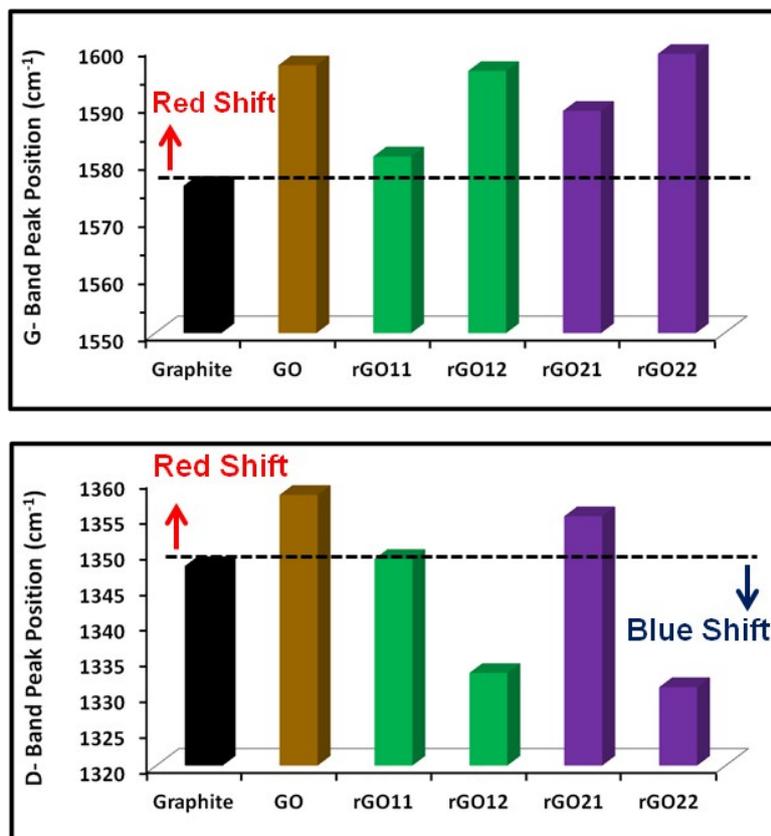
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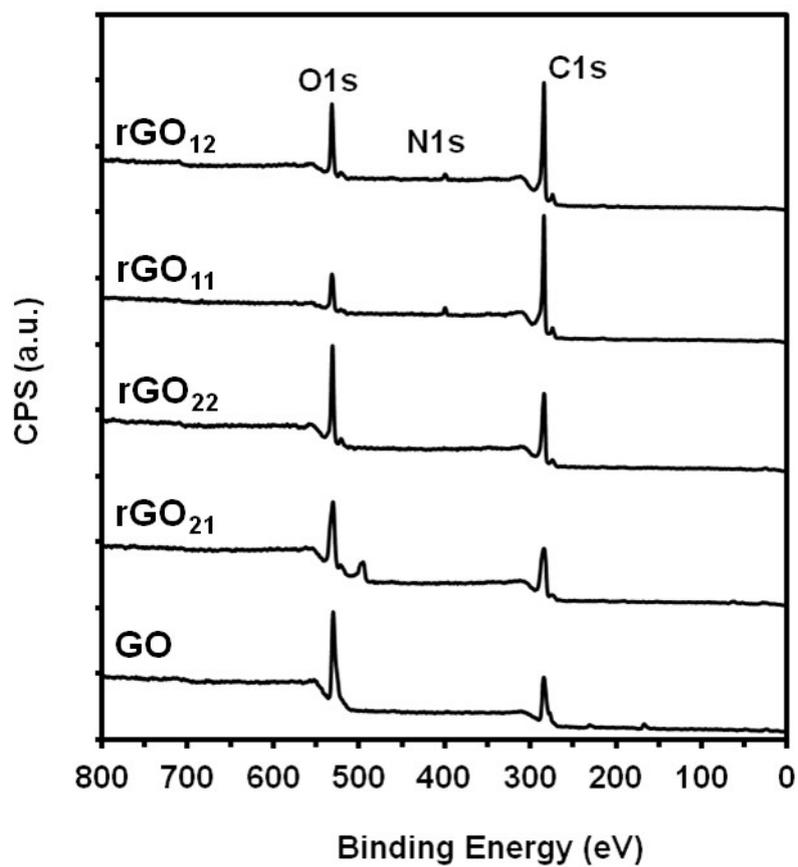
**SFig. 1** (Top) G-band peak position and (Down) D-band peak position of graphite, graphene oxide (GO), N<sub>2</sub>H<sub>4</sub> reduced GO (rGO<sub>11</sub>), NaBH<sub>4</sub> reduced GO (rGO<sub>21</sub>), soda lime reduced rGO<sub>11</sub> (rGO<sub>12</sub>) and soda lime reduced rGO<sub>21</sub> (rGO<sub>22</sub>).

**SFig. 2** Wide scan spectra of graphene oxide (GO), N<sub>2</sub>H<sub>4</sub> reduced GO (rGO<sub>11</sub>), NaBH<sub>4</sub> reduced GO (rGO<sub>21</sub>), soda lime reduced rGO<sub>11</sub> (rGO<sub>12</sub>) and soda lime reduced rGO<sub>21</sub> (rGO<sub>22</sub>).

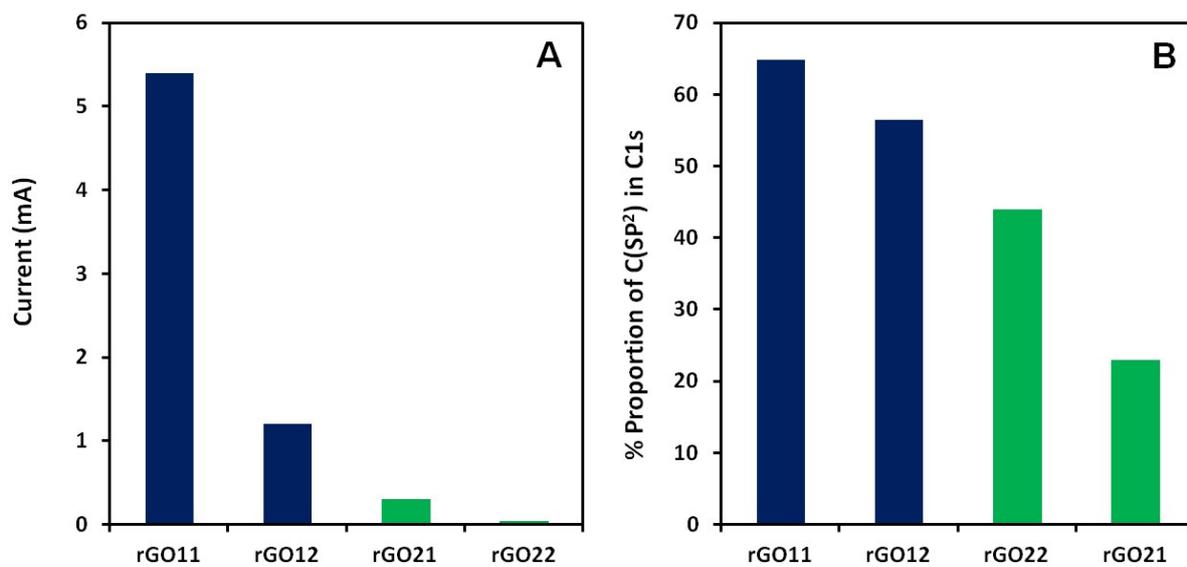
**SFig. 3** (A) Current at 4V bias volt in I-V response curve and (B) relative proportion of carbon atoms having sp<sup>2</sup> state in C1s XPS spectra of N<sub>2</sub>H<sub>4</sub> reduced GO (rGO<sub>11</sub>), NaBH<sub>4</sub> reduced GO (rGO<sub>21</sub>), soda lime reduced rGO<sub>11</sub> (rGO<sub>12</sub>) and soda lime reduced rGO<sub>21</sub> (rGO<sub>22</sub>).



**SFig 1.** (Top) G-band peak position and (Down) D-band peak position of graphite, graphene oxide (GO), N<sub>2</sub>H<sub>4</sub> reduced GO (rGO<sub>11</sub>), NaBH<sub>4</sub> reduced GO (rGO<sub>21</sub>), soda lime reduced rGO<sub>11</sub> (rGO<sub>12</sub>) and soda lime reduced rGO<sub>21</sub> (rGO<sub>22</sub>).



**SFig 2.** Wide scan spectra of graphene oxide (GO), N<sub>2</sub>H<sub>4</sub> reduced GO (rGO<sub>11</sub>), NaBH<sub>4</sub> reduced GO (rGO<sub>21</sub>), soda lime reduced rGO<sub>11</sub> (rGO<sub>12</sub>) and soda lime reduced rGO<sub>21</sub> (rGO<sub>22</sub>).



**SFig. 3** (A) Current at 4V bias volt in I-V response curve and (B) relative proportion of carbon atoms having sp<sup>2</sup> state in C1s XPS spectra of N<sub>2</sub>H<sub>4</sub> reduced GO (rGO<sub>11</sub>), NaBH<sub>4</sub> reduced GO (rGO<sub>21</sub>), soda lime reduced rGO<sub>11</sub> (rGO<sub>12</sub>) and soda lime reduced rGO<sub>21</sub> (rGO<sub>22</sub>).