# A supercritical alcohol route for synthesizing hydrogen-enriched reduced graphene oxide with enhanced electrochemical performance in lithium ion batteries

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We report a supercritical alcohol route to synthesis hydrogen-enriched reduced graphene oxide (RGO) using double oxidized graphene oxide (GO2) for use as anode in high-performance lithium batteries. GO2 exhibited much lower carbon-to-oxygen ratio, lower crystallinity, higher Brunauer-Emmett-Teller surface area, higher pore volume, and higher porosity when compared to graphene oxide produced using modified Hummers method (GO1). The two different GOs were reduced using supercritical isopropanol (scIPA) or heat-treatment, and chemical, morphological, and textural properties were investigated in detail. Gavanostatic charge-discharge properties were highly dependent on the physicochemical properties of RGOs. The scIPA reduced-GO2 exhibited superior electrochemical performance to thermally reduced-GO1/GO2 and scIPA reduced-GO1.