Supplementary Information

Binder-free Rice husk-based Silicon-Graphene Composite Paper as Energy Efficient Li-ion Battery Anodes

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S1. Preparation of GO suspension

GO was prepared using a modified Hummers and Offeman’s method. In a typical reaction, graphite (2.5 g, ITRI), sodium nitrate (NaNO₃, 2.5g, reagent grade, Aldrich) and sulfuric acid (H₂SO₄, 115 mL, Acros) were stirred together in an ice bath. Potassium permanganate (KMnO₄, 7.5g, Aldrich) was slowly added while stirring, and the rate of addition was controlled to prevent the mixture temperature from exceeding 20°C.

The mixture was then transferred to a 35°C water bath and stirred for about 0.5 hour, forming a thick paste. Subsequently, de-ionized water (115 mL) was added gradually, causing an increase in temperature to 98°C. After 15 min., the mixture was further treated with de-ionized water (350 mL) and H₂O₂ solution (30%, 25 mL). The warm solution was then filtered and washed with de-ionized water until the pH was 7 and dried at 65°C under vacuum.
Fig. S2. Cross-sectional SEM image of the Si-graphene composite paper
Fig. S3. XRD spectra of the rice husk-based Si NPs composite before (black) and after (gray) thermal reduction in Ar atmosphere
**Fig. S4.** Raman spectra of the rice husk-based Si NPs composite before (black) and after (gray) thermal reduction in Ar atmosphere.
**Fig. S5.** SEM-EDS spectra of the rice husk-based Si NPs composite (a) before and (b) after thermal reduction in Ar atmosphere.
