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Supercapacitors based on Patronite-Reduced Graphene Oxide Hybrids: Experimental and Theoretical Insights

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Supporting Information

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Here VS_4/RGO with 0.75 wt%, 1.5 wt% and 3 wt% of RGO content are respectively denoted with VS_4/RGO_0.75, VS_4/RGO_1.5 and VS_4/RGO_3.

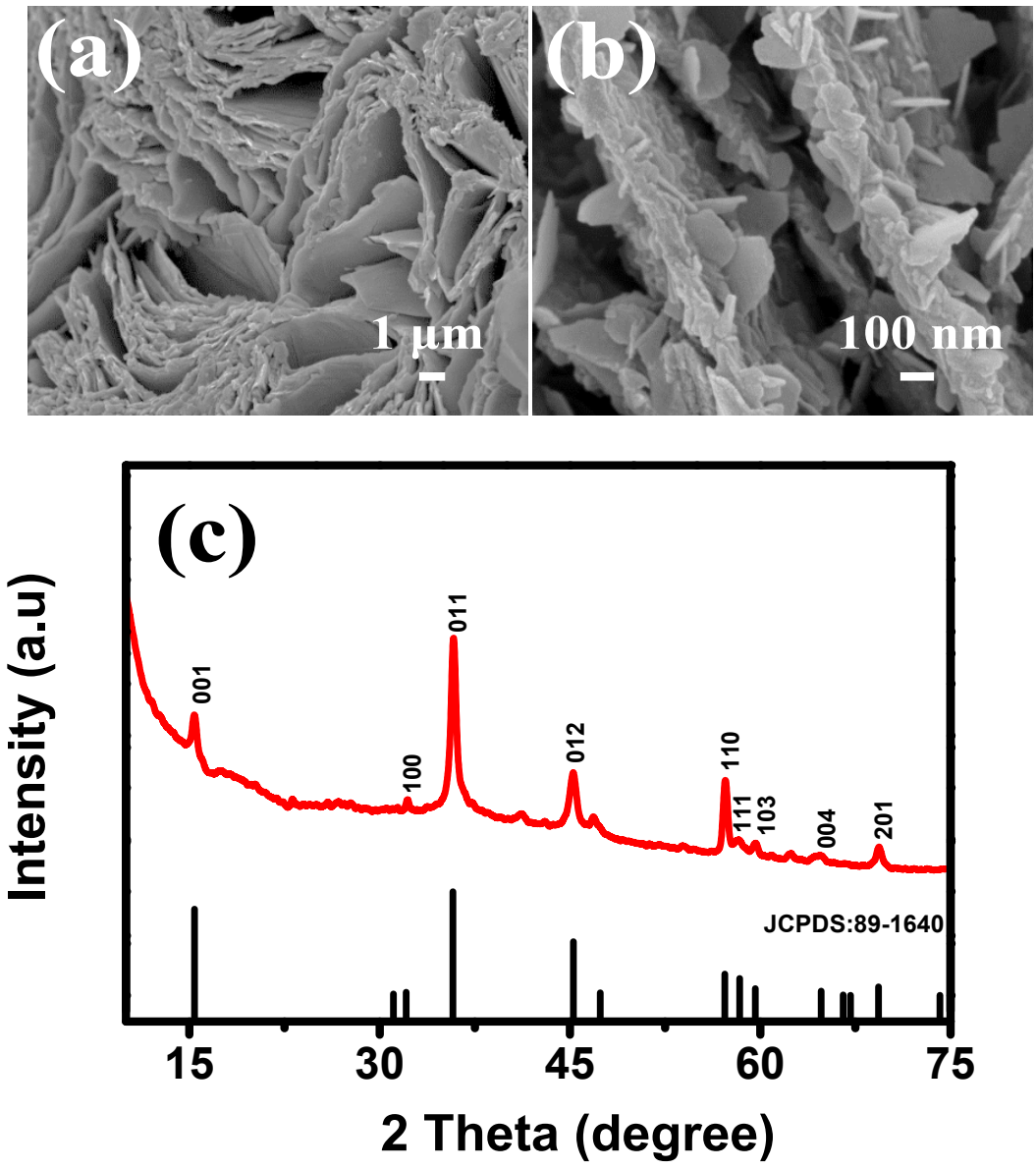

Fig. S1 Low (a) and high (b) magnified images of VS_2 microflakes showing numerous protruding edges. (c) XRD pattern for VS_2.

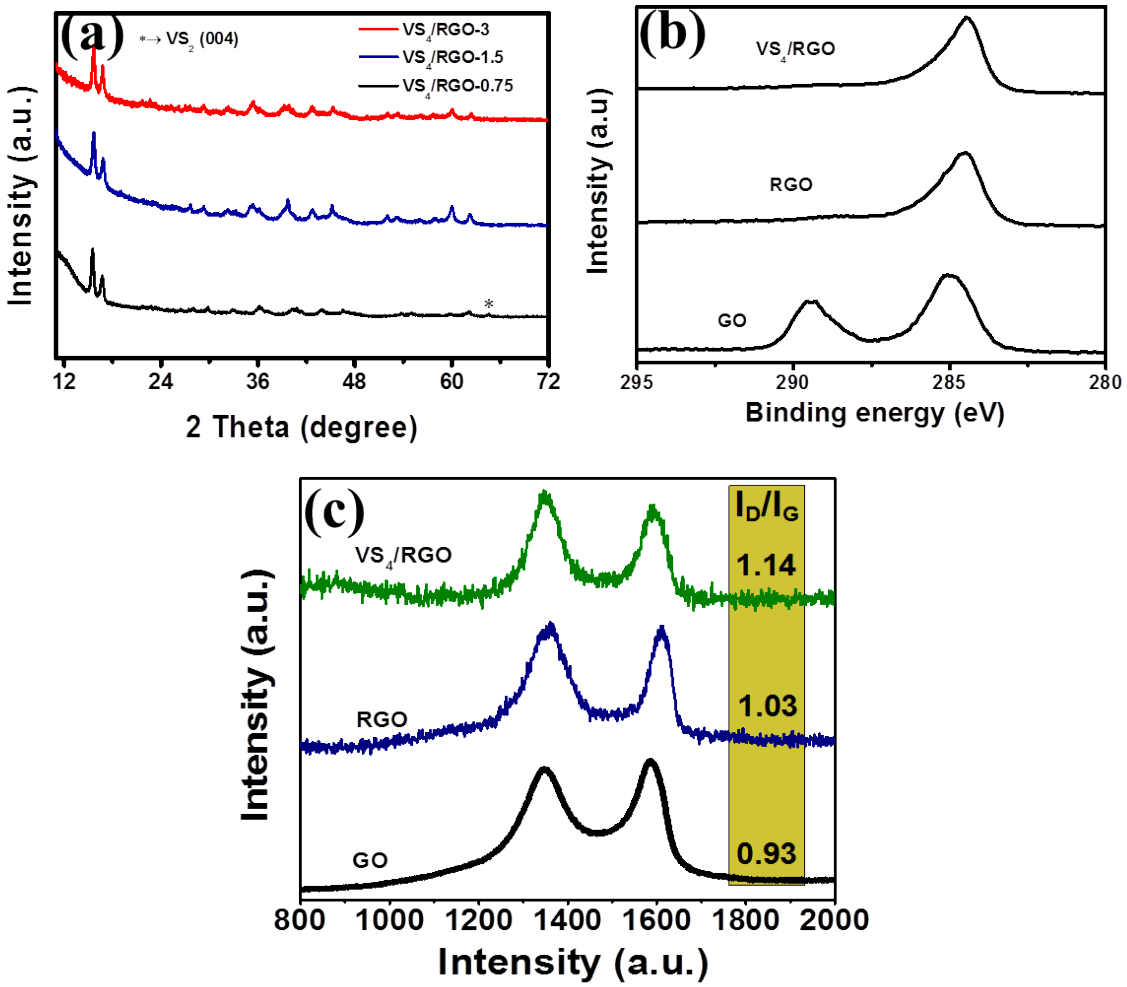

Fig. S2 (a) XRD patterns for VS_4/RGO hybrids containing 0.75wt% (black), 1.5wt% (blue) and 3wt% (red) of RGO. The asterisk mark denotes an additional peak corresponding to the (004) phase growth of VS_2. (b) X-ray photoelectron spectroscopy showing C1s spectra for GO, RGO and VS_4/RGO. (c) Raman spectra for GO, bare RGO and RGO content in the hybrid with I_D/I_G ratio confirming the reduction of GO to form RGO. The reduction of GO to RGO was better in case of the hybrid than that of bare RGO.

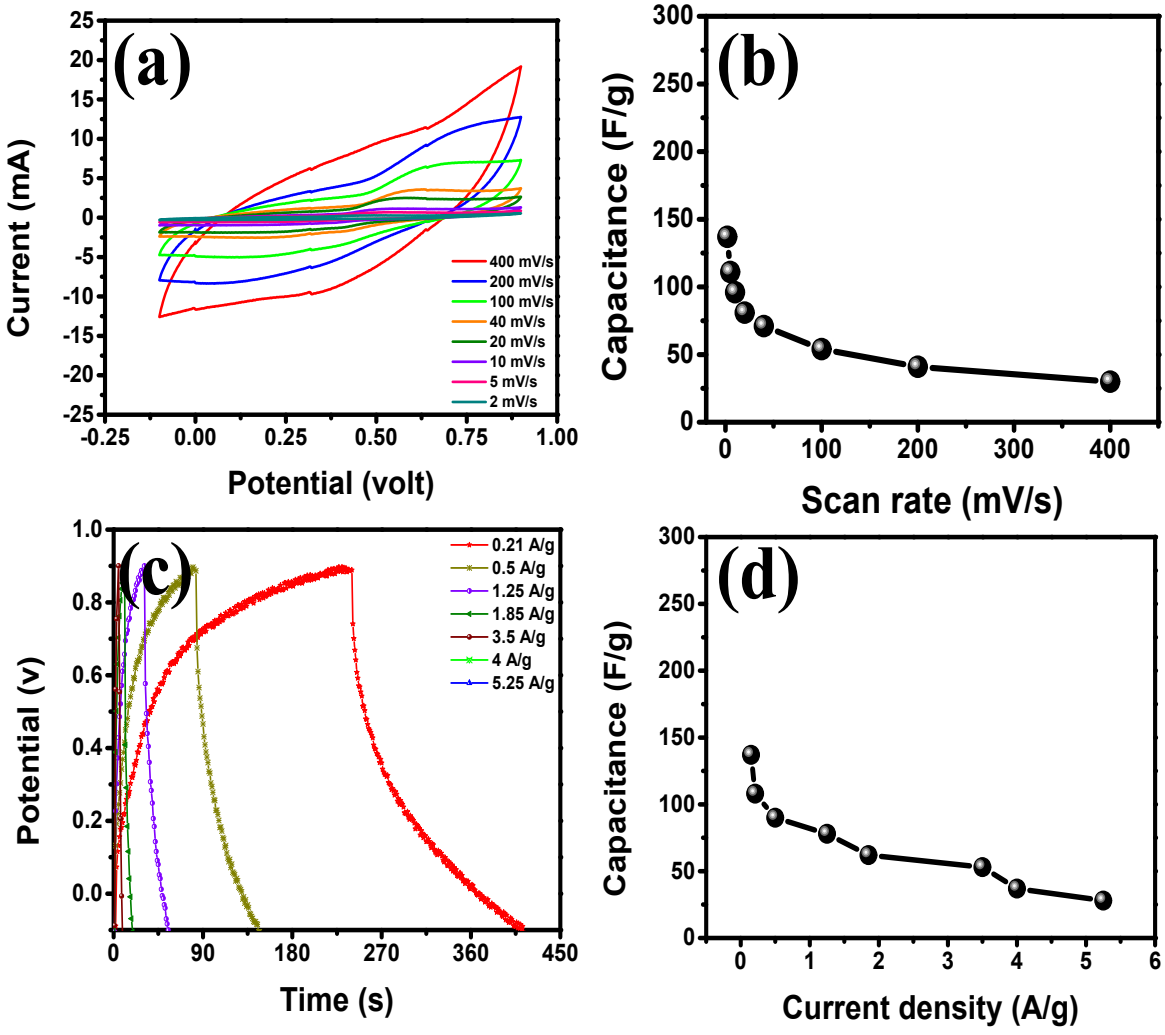

Fig. S3 (a) Cyclic voltammetry curves for VS_2, (b) graph, showing variation of specific capacitance with scan rate. (c) charge-discharge curves for different current densities. Symmetric curves depicting reversible redox (Faradic) reaction. (d) plot between specific capacitance and current density for VS_2.

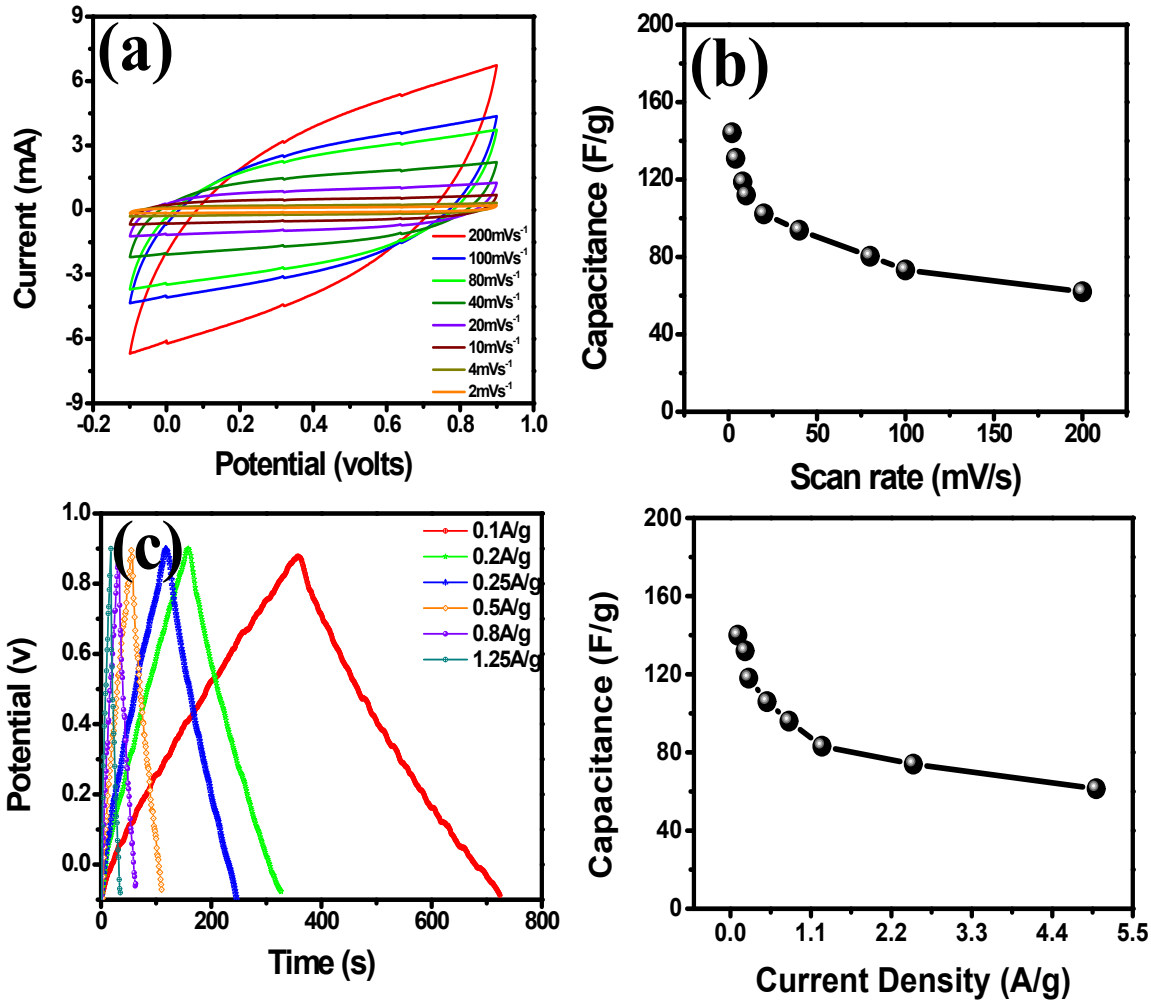

Fig. S4 Supercapacitor data for RGO. (a) cyclic voltammetry curves, (b) graph showing variation of specific capacitance with scan rate, (c) charge-discharge curves at different current densities, (d) plot between specific capacitance and current density.

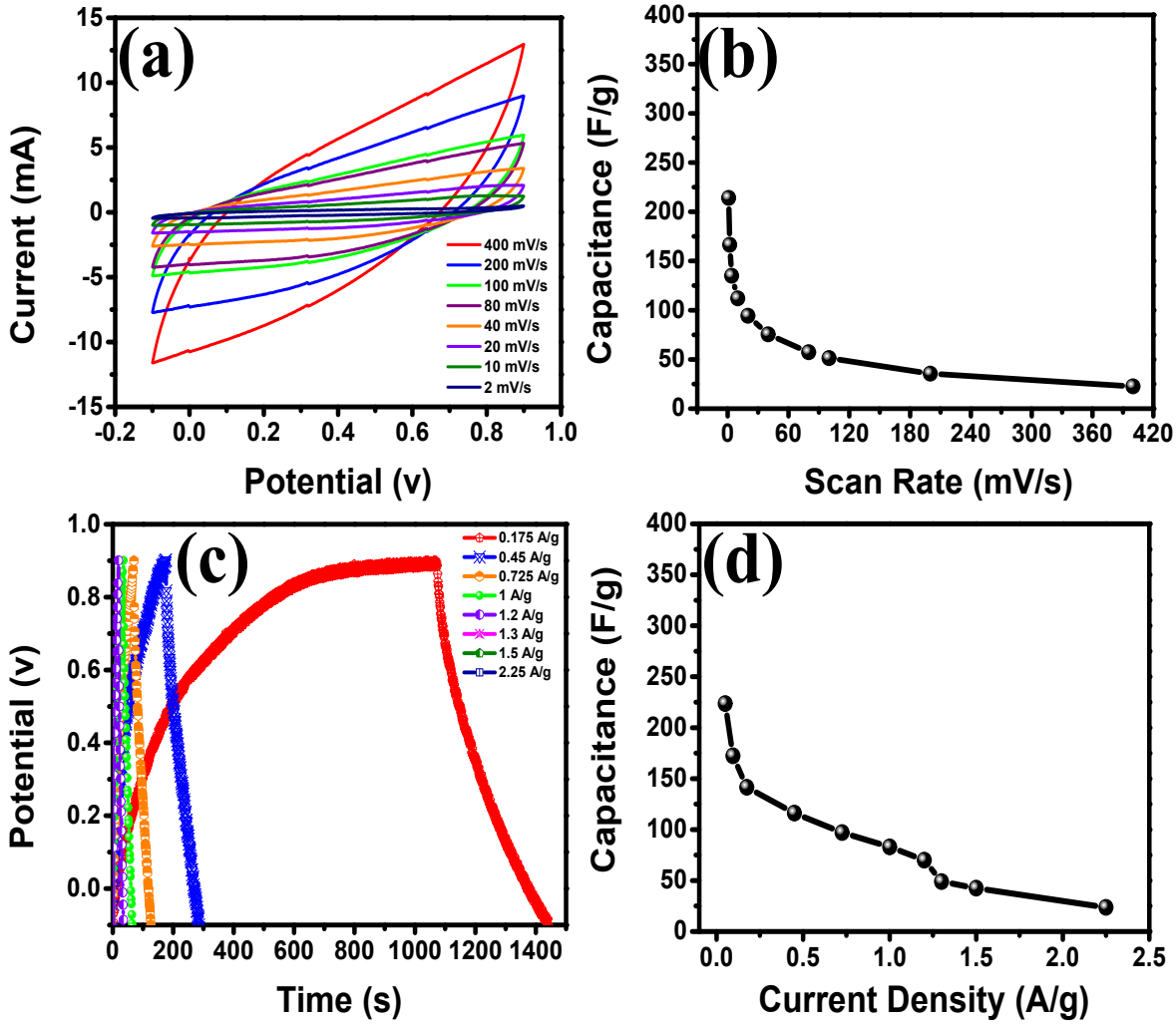

Fig. S5 Detailed supercapacitor study for VS_4/RGO_0.75. (a) cyclic voltammetry curves, (b) plot between specific capacitance and scan rate, (c) charge-discharge curves at different current densities, (d) plot between specific capacitance and current density.

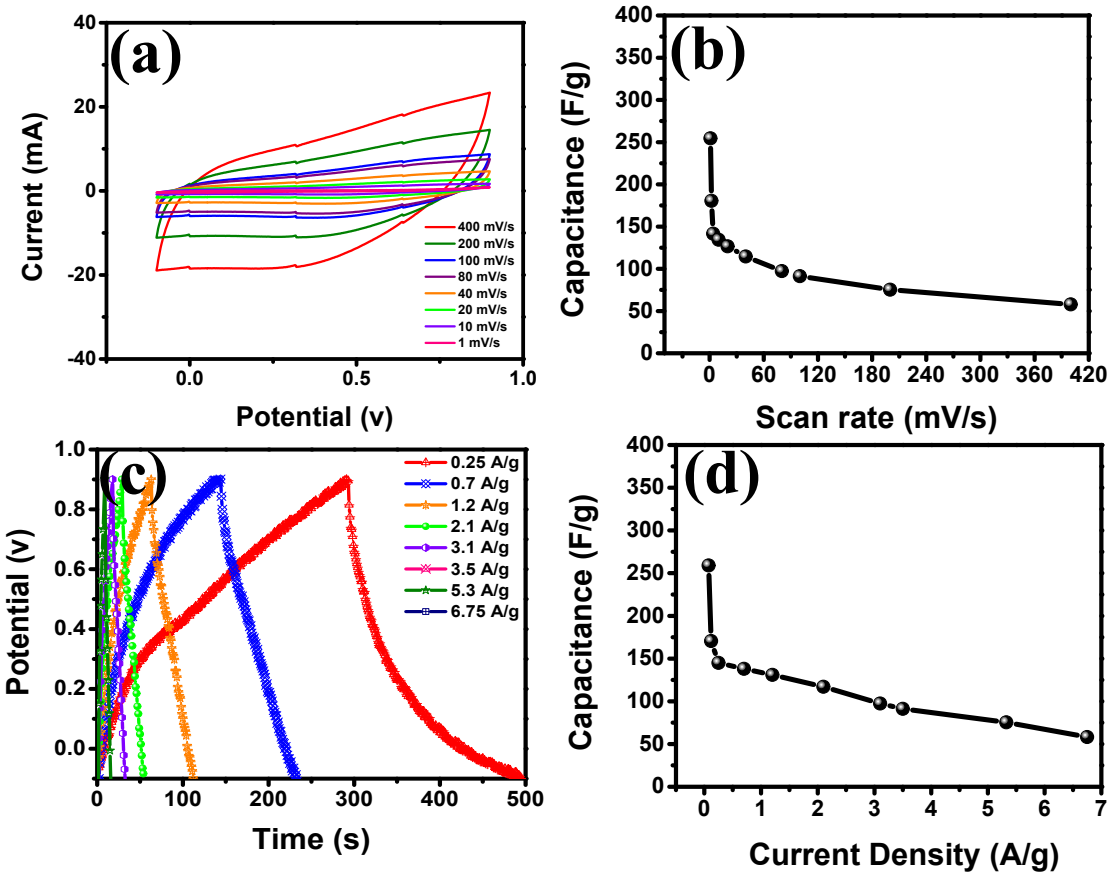

Fig. S6 Supercapacitor data for VS_4/RGO_3. (a) cyclic voltammetry curves, (b) plot of specific capacitance against scan rate, (c) charge-discharge curves at different current densities, (d) specific capacitance vs current density plot.

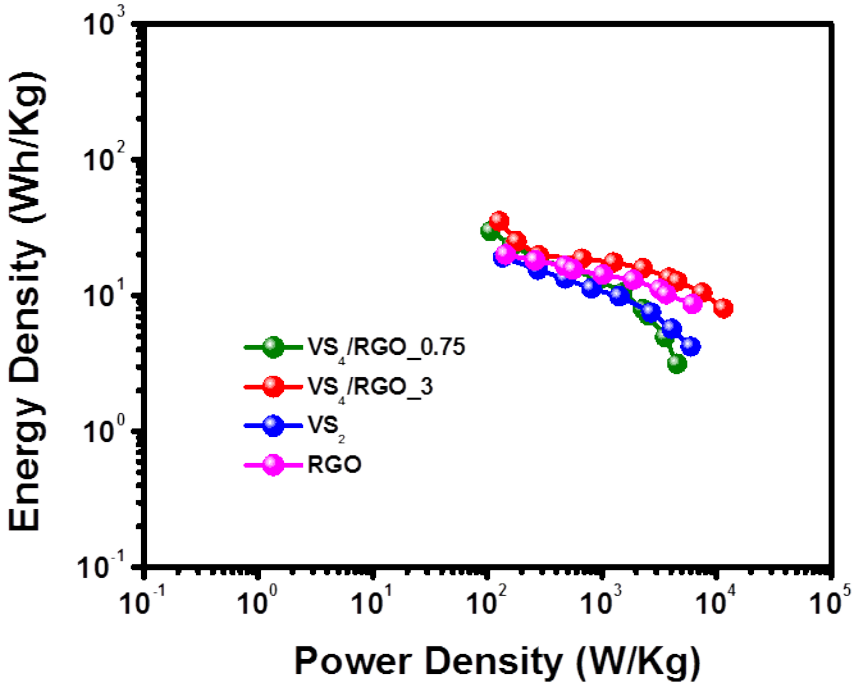

Fig. S7 Ragone plots for VS_4/RGO_0.75, VS_4/RGO_3, VS_2 and RGO.

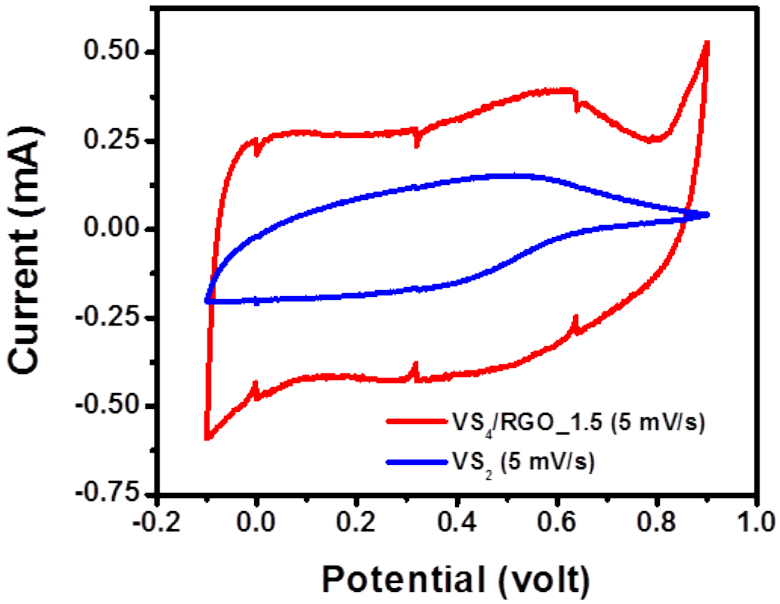

Fig. S8 (a) Three electrode data (cyclic voltammetry curves) of VS_4/RGO_1.5 (red) and VS_2 (blue).