Supporting Information

Graphene coated $Co_3V_2O_8$ micro-pencils for enhanced-performance in lithium ion batteries

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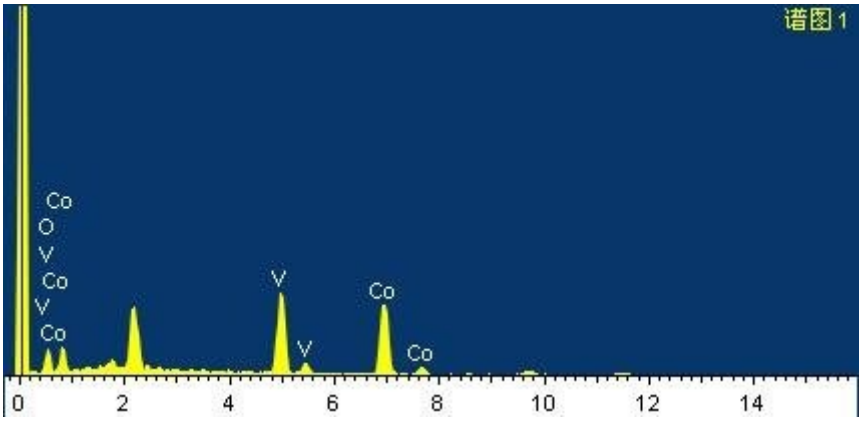

Fig. S1 The original EDS curve of $Co_3V_2O_8$.

Element	Mass ratio(%)	Atomic ratio(%)
O K	18.27	43.88
V K	27.61	20.83
Co K	54.13	35.30
Total amount	100.00	100.00

Table. S1 Detailed atomic ratio of Co/V.

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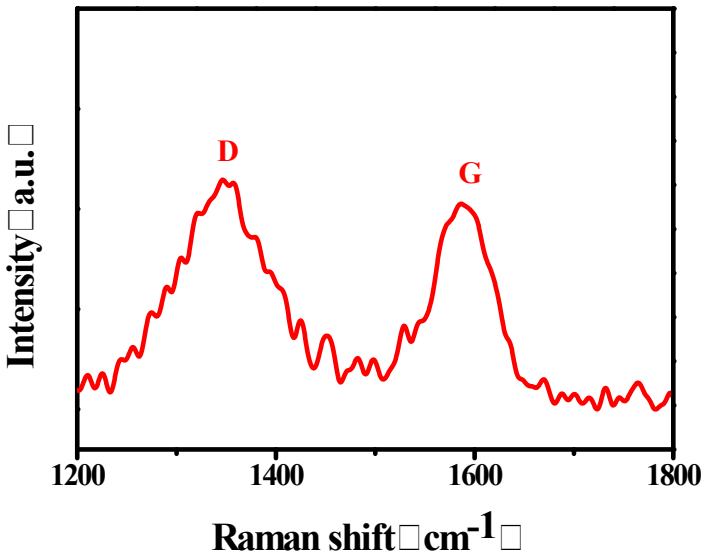


Fig. S2 Raman spectroscopy of as-prepared rGO@CVO MPs.

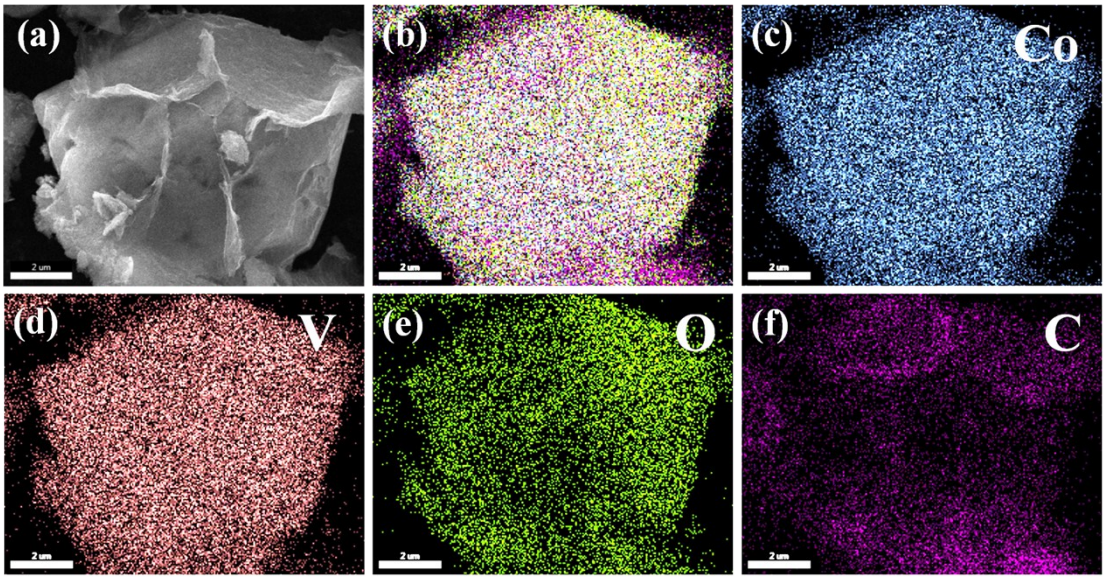


Fig. S3 (c-f) The corresponding elemental mapping images of Co, V, O and C in the rGO@CVO MPs (a).

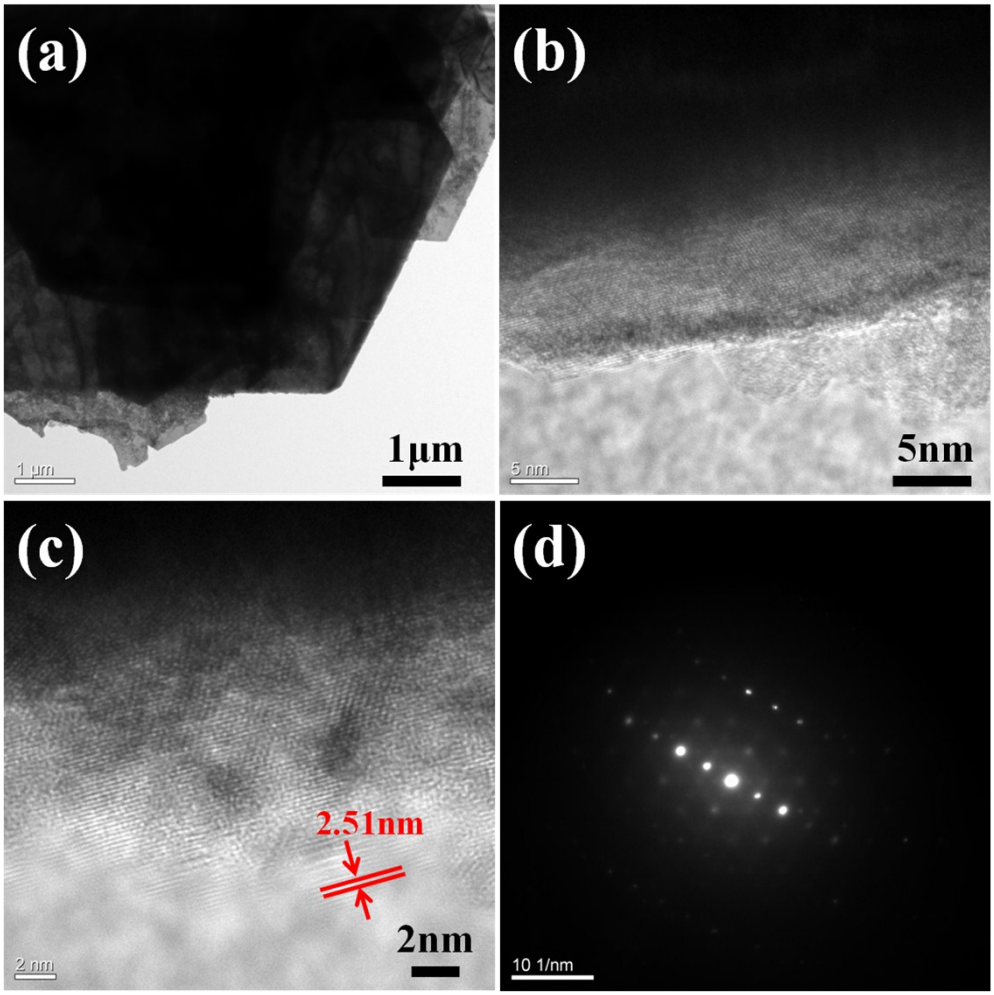
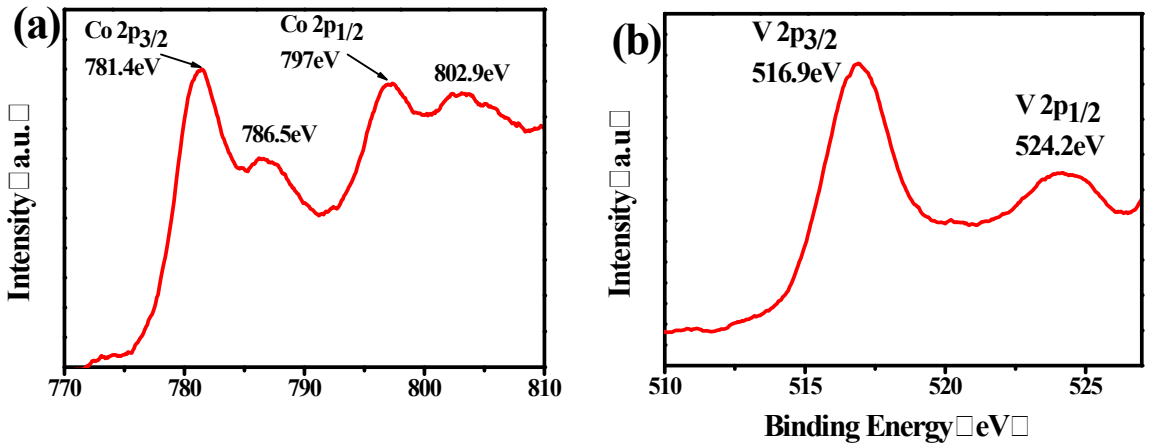


Fig. S4 (a) TEM image of pCVO MPs, (b and c) HRTEM images of pCVO MPs. (d) TEM images, (e) HRTEM images and (f) SEAD pattern of the pCVO MPs.



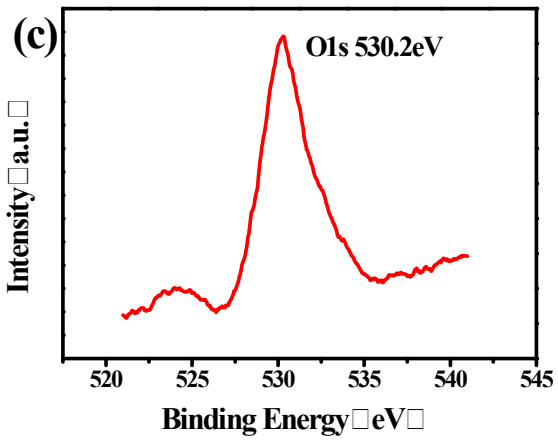


Fig. S5 (a-c) The XPS spectra of pCVO MPs: (a) Co 2p, (b) V 2p, (c) O 1s.

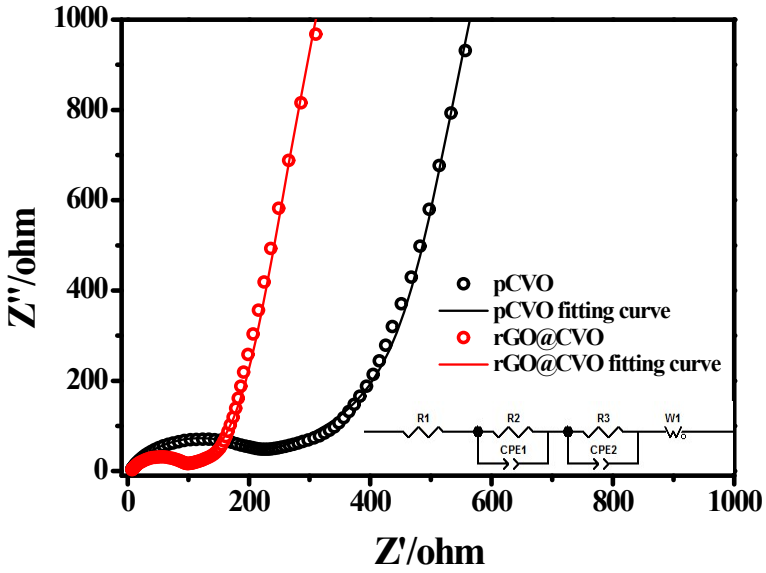


Fig. S6 The EIS curves of electrodes after 200 cycles at 1000mAhg^{-1} and the corresponding equivalent circuits.

The equivalent circuits contains equivalent series resistance (R1), SEI resistance (R2), and charge transfer resistance (R3). Meanwhile, CPE1 and CPE2 are the capacitance related to SEI and the double layer, while W1 corresponds to the ion diffusion in the active material.

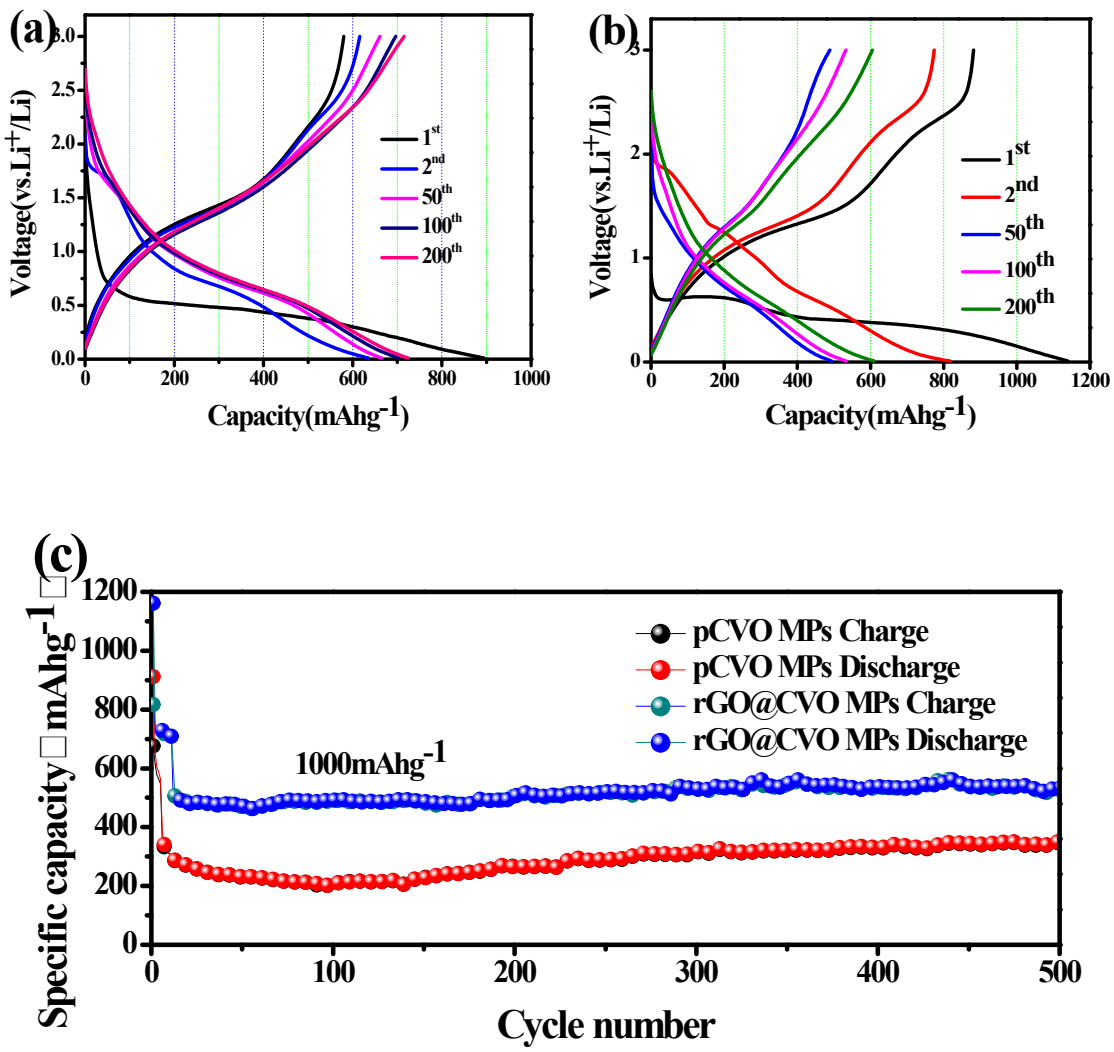


Fig. S7 (a, b) The charge/discharge profile in the first, 2nd, 50th, 100th, 200th cycles of rGO@CVO MPs and pCVO MPs. (c) Cycling performance of the two samples at current densities of 1000mAg^{-1}.

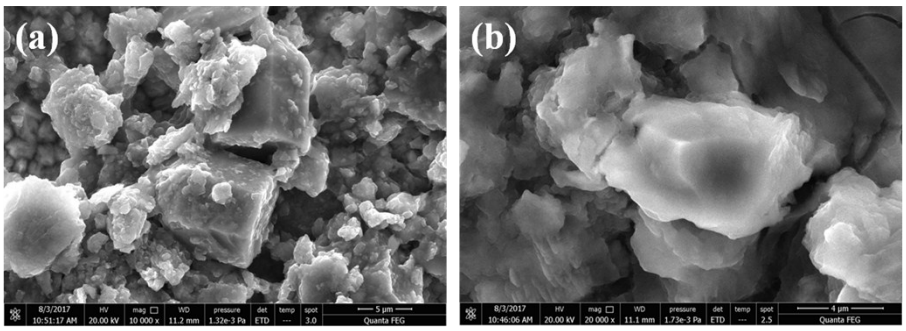


Fig. S8 The SEM image of the electrode (rGO@CVO MPs): (a) before cycling, (b) after 200 cycles at 1000mAhg^{-1}.