

Supplemental Material for “Electrochemical Behavior of Vanadium Carbide in Neutral Aqueous Electrolytes”

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For systems exhibiting capacitive and semi-infinite linear diffusion process, the current (i) for capacitive process of a cyclic voltammetry experiment is proportional to sweep rate(v), while the current of diffusion limited process is proportional to $v^{1/2}$. the current flowing at a specific potential $i(V)$ is defined as:

$$i(V) = k_1 v + k_2 v^{1/2} \dots \dots \dots (1)$$

where k_1 and k_2 are fitting parameters. A plot of $i(V)/v^{1/2}$ versus $v^{1/2}$ should produce a straight line from which k_1 and k_2 can be determined, and hence the contributions to capacitive and diffusive current can be deduced[1].

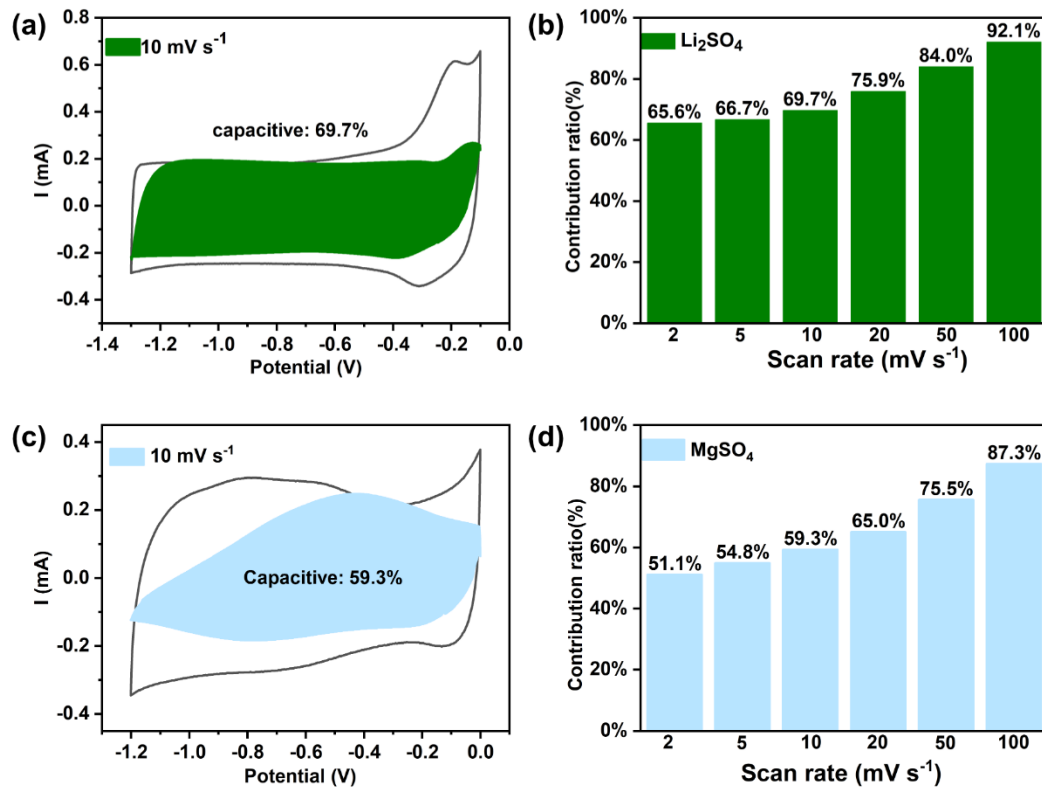


Figure.S1 capacitive contribution of d- V_2C in Li_2SO_4 (a), (b) and MgSO_4 (c), (d)

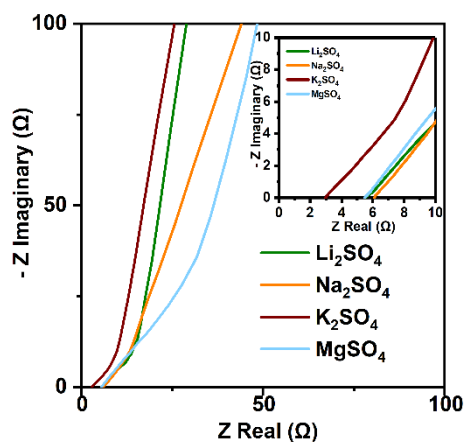


Figure.S2 Nyquist plot from EIS.

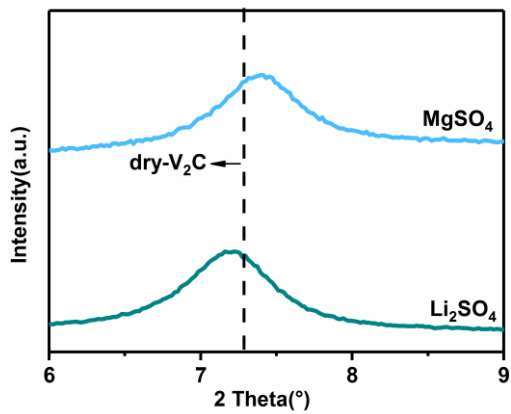


Figure.S3 XRD patterns of d-V₂C dry and immersed in 0.5 M Li₂SO₄ and 1 M MgSO₄. Electrochemical in situ X-Ray diffraction study of d-V₂C in different electrolytes.

Reference

[1]Augustyn V, Come J, Lowe M A, Kim J W, Taberna P-L, Tolbert S H, Abruña H D, Simon P and Dunn B 2013 *Nature Materials* **12** 518