Supporting Information for

Substrate-Mediated Growth of Vanadium Carbide with Controllable Structure as High Performance Electrocatalysts for Dye-Sensitized Solar Cells

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KEYWORDS: Vanadium carbide; crystal structure; triiodide reduction reaction; dye-sensitized solar cells.

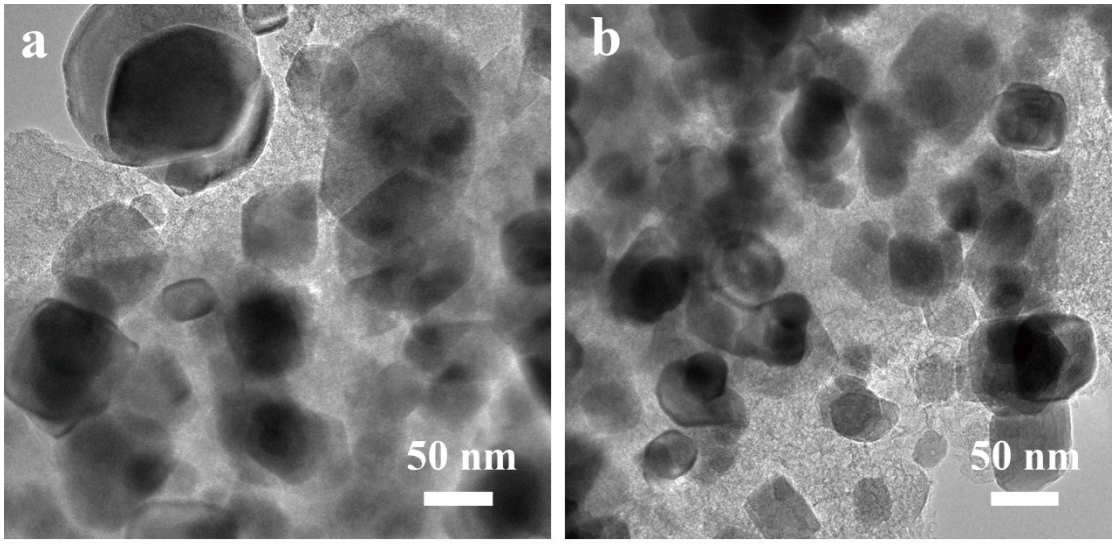

Figure S1.VC nanoparticles synthesis by different cyanamide to V atomic ratio: (a) 8, named as VC8, and (b) 12, named as VC12.

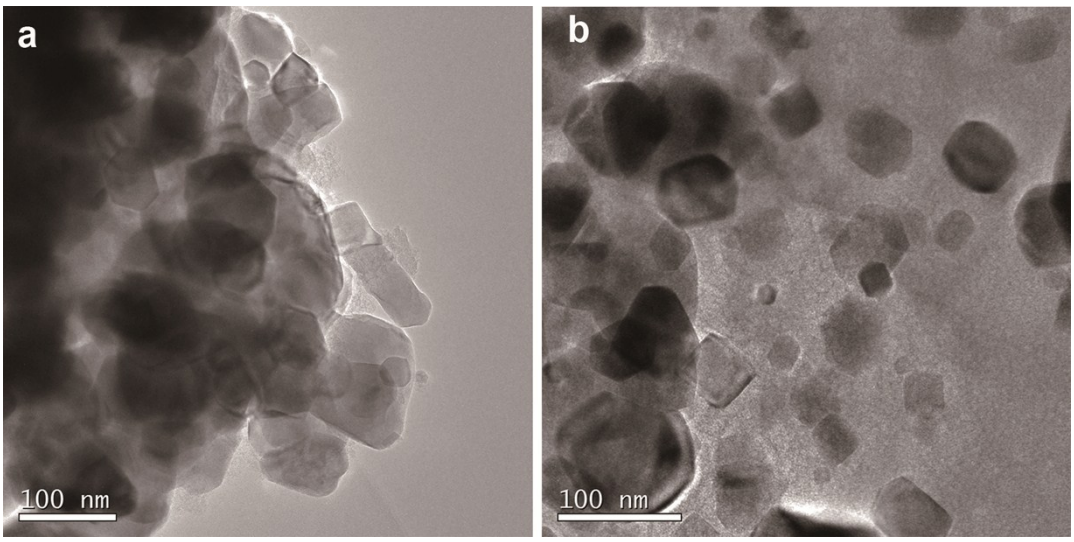

Figure S2. VC-GS synthesized with different ratio of $VOCl_3$ to GO (a) 5 mmol $VOCl_3$ with 100 mg GO precursor (b) 0.5 mmol $VOCl_3$ with 100 mg GO precursor

Table s1. The electronic conductivity of various samples measured with four-probe technology

Sample	ρ_s (Ω *cm)
VC-ch/GS	0.09
VC-cb/GS	0.08
VC8	0.10
VC12	0.09

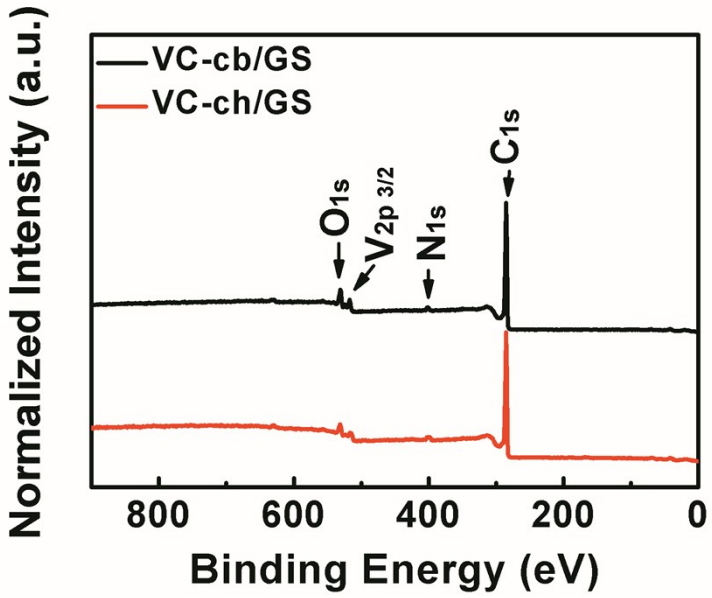

Figure S3. XPS spectrum of VC-ch/RGO hybrid and VC-cb/RGO hybrid.

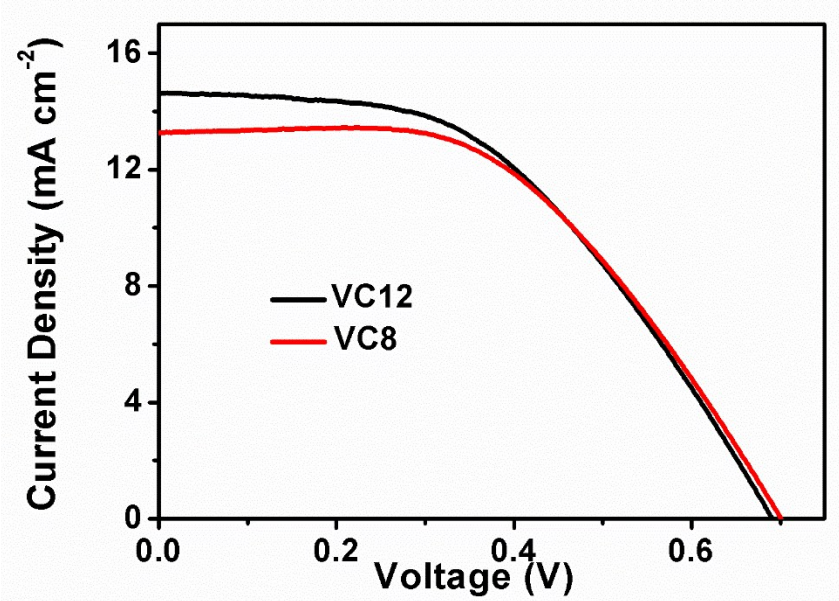

Figure S4. Photocurrent density-voltage curves of DSSCs with the VC8 and VC12 CEs, measured under standard AM 1.5 G illumination (100mWcm^{-2})

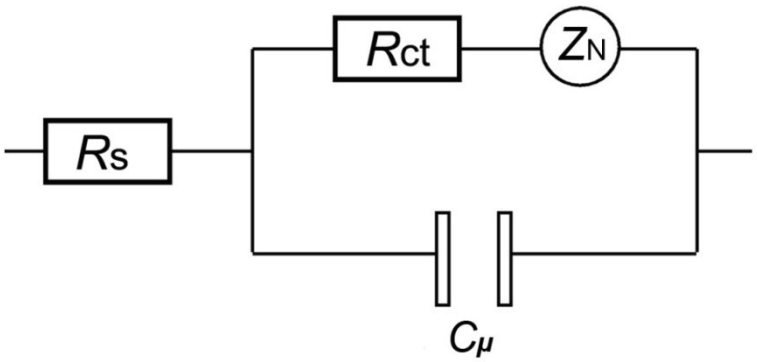

Figure S5. Equivalent circuit of the symmetric dummy cells used in EIS measurement.

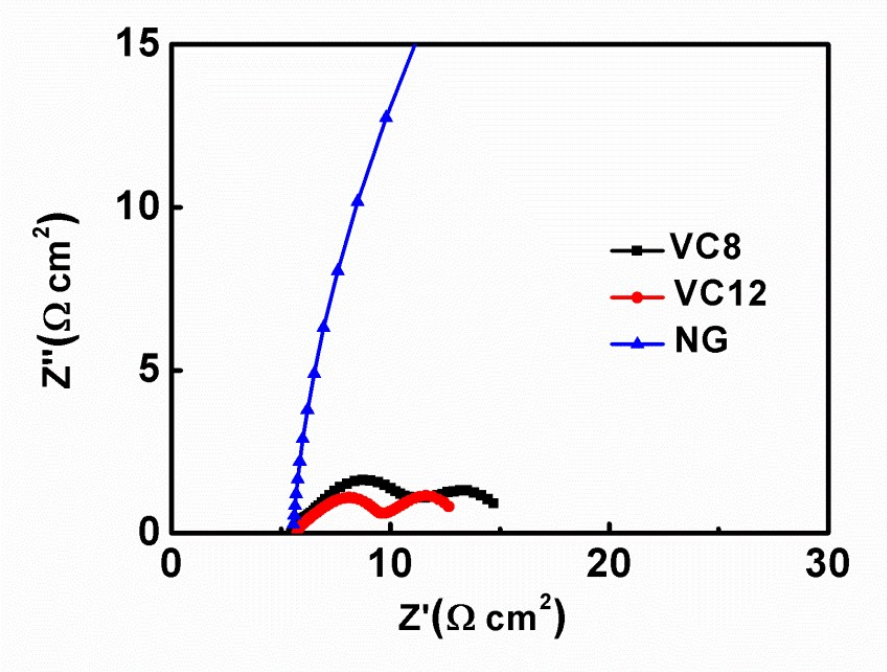

Figure S6. Nyquist plot of the symmetric dummy cells fabricated by VC8, VC12, and N-doped graphene counter electrodes (CEs).

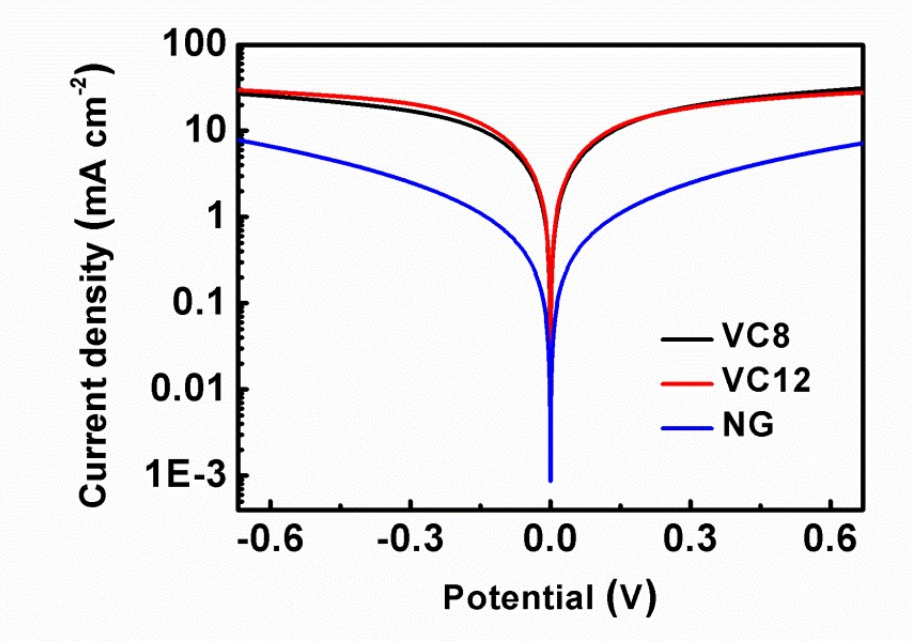

Figure S7. Tafel polarization curves of the symmetric dummy cellswith VC8, VC12, and N-doped graphene counter electrodes (CEs).