Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Graphitic C3N4 as Powerful Catalysts for All-Vanadium Redox Flow Batteries

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Sample	Ipa(mA)	Ipc(mA)	Vpa(V)	Vpc(V)	Ipa/Ipc	ΔE(V)
Pure	10.50	5.48	1.18	0.59	1.92	0.59
C_3N_4-CF	12.95	13.84	0.91	0.76	0.93	0.16

Table S1. Electrochemical properties a obtained from cyclic voltammetry results for untreated and different Electrodes at a Scan Rate of 1mV s^{-1}.

Sample	R_S	Qm		R_P	Qt	
		Y1(mMho)	N1		Y2(Mho)	N2
Pure	1.64	0.722	0.915	53.1	0.68	0.732
C_3N_4-CF	1.53	1.10	0.925	23.9	1.35	0.828

Table S2. Fit Parameters Resulting from the Equivalent Circuit Model in Figure 4.

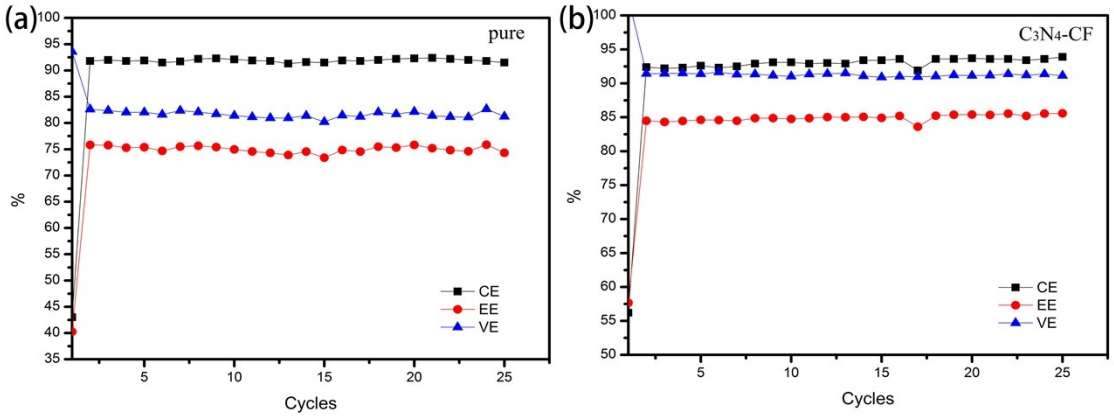

Fig. S1 CE, VE, EE data of cell with pure CF (a) and C_3N_4-CF(b) at the current density of 50 mA cm^{-2} for 25 charge-discharge cycles.

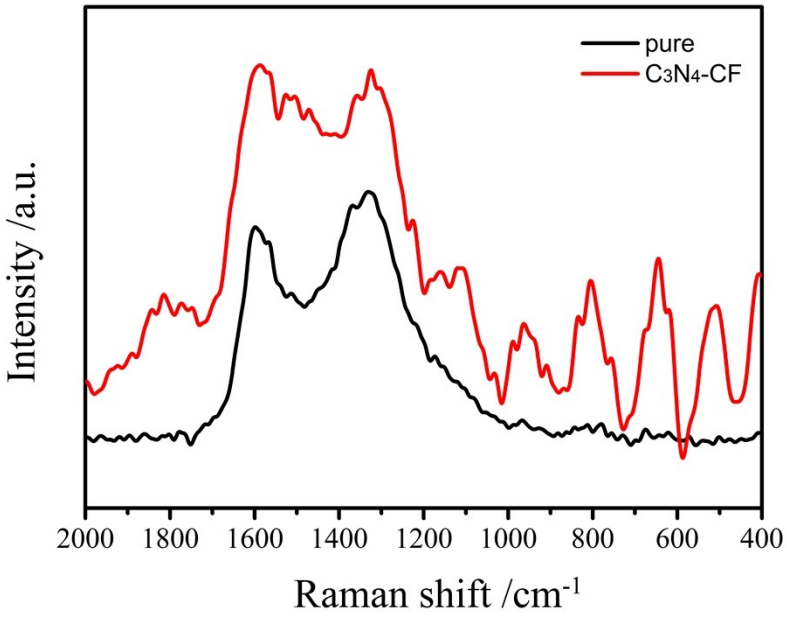

Fig. S2 Raman spectroscopy of C_3N_4-CF electrode.

Raman spectroscopy results showed that the existence of C_3N_4.

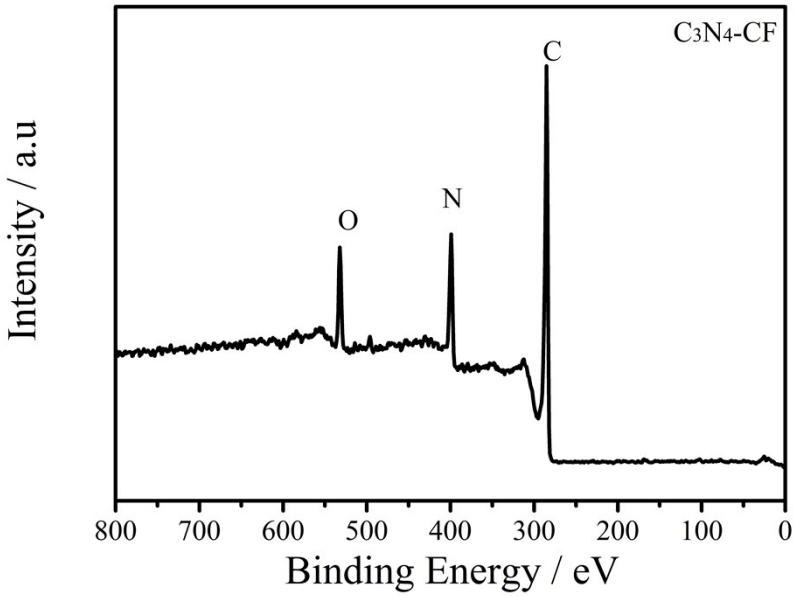

Fig. S3 XPS spectrum of g-C_3N_4

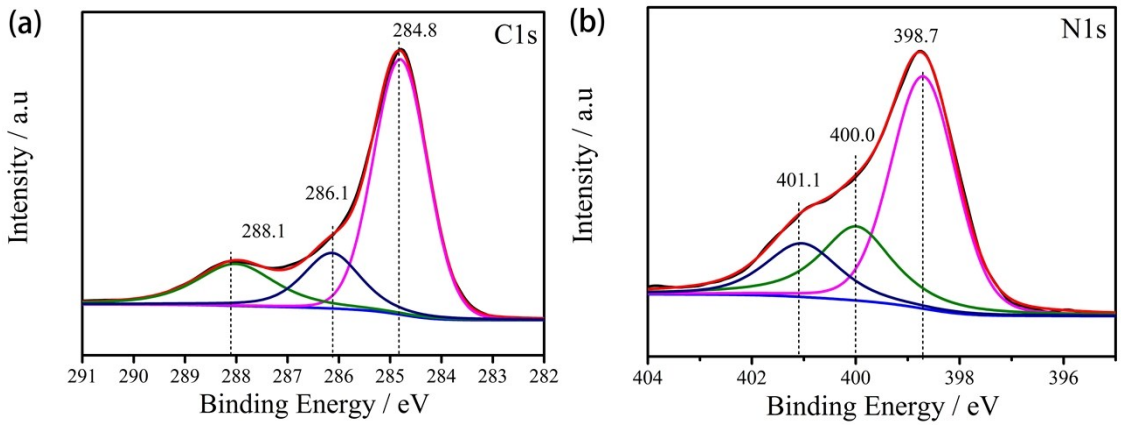

Fig. S4 C1s (a) and N1s (b) XPS spectra of the g-C_3N_4

In Figure S3(a), the peak at 284.8 eV belongs to C-C coordination, and the peak centered at 288.1 eV corresponds to C-N coordination of C_3N_4-CF[1], and there is another peak at around 286.1 eV could be attributed to the C–NH_2 species of the C_3N_4-CF. In addition, the sample exhibit N1s profiles at 398.7, 400.0 and 401.1 eV which can be attributed to sp^2-hybridized nitrogen (C–N–C), sp^3-hybridized nitrogen (N–$[C]_3$) and amino functional groups with a hydrogen atom (C–NH), respectively. The results demonstrate the presence of C_3N_4 surface in the CF.

1. Y. Zhao, F. Zhao, X. Wang, C. Xu, Z. Zhang, G. Shi and L. Qu, *Angew Chem Int Ed Engl*, 2014, **53**, 13934-13939.