Electronic Supplementary Material (ESI) for Energy Advances.

Supporting Information

Interfacing NiV layered double hydroxide with sulphur doped g-C_3N_4 as a novel electrocatalyst for enhanced hydrogen evolution reaction through Volmer-Heyrovsky Mechanism

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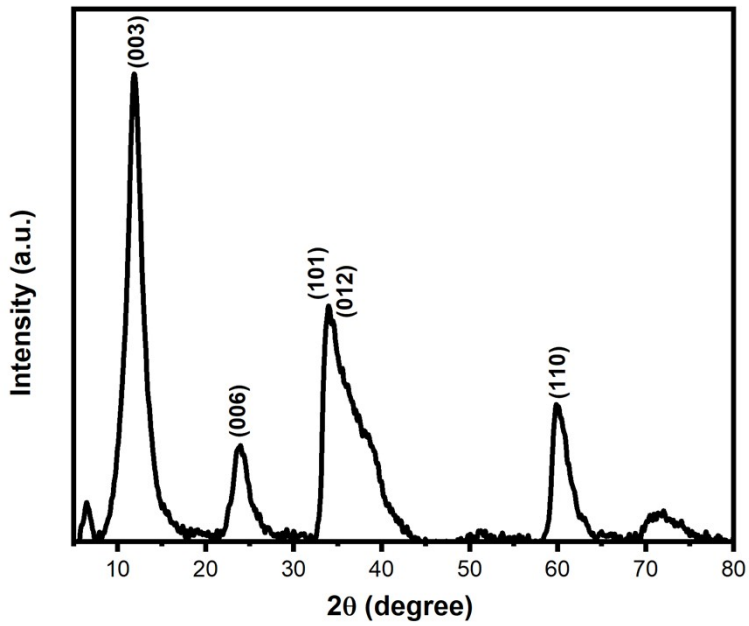

Fig S1. XRD pattern of NiV LDH

Table S1. Avg. crystallite size and strain of the samples calculated from Scherer's formula

Sample	Peak centre	FWHM	Crystallite size	Avg. Crystallite Size	Strain	Avg. Strain
gCN	12.9	1.96274	4.2576291	5.33730141	0.00878581	0.007670283
	27.52	1.33226	6.41697372		0.00655475	
S-gCN	12.76	1.90801	4.37915479	5.29871183	0.00853607	0.007651663
	27.56	1.37495	6.21826886		0.00676725	
gCN/NiV	12	2.91071	2.86853139	4.60322106	0.0129841	0.011811155
	27.86	1.34052	6.38209891		0.00661596	
	33.84	2.10118	4.13074505		0.01103801	
	59.96	1.90527	5.03150888		0.01660654	
S-gCN/NiV	12.04	2.44392	3.41654794	4.44959706	0.01090346	0.013364389
	27.82	1.24487	6.87187505		0.00614163	
	33.8	3.92843	2.2091568		0.02062735	
	60	1.80884	5.30080842		0.01578511	

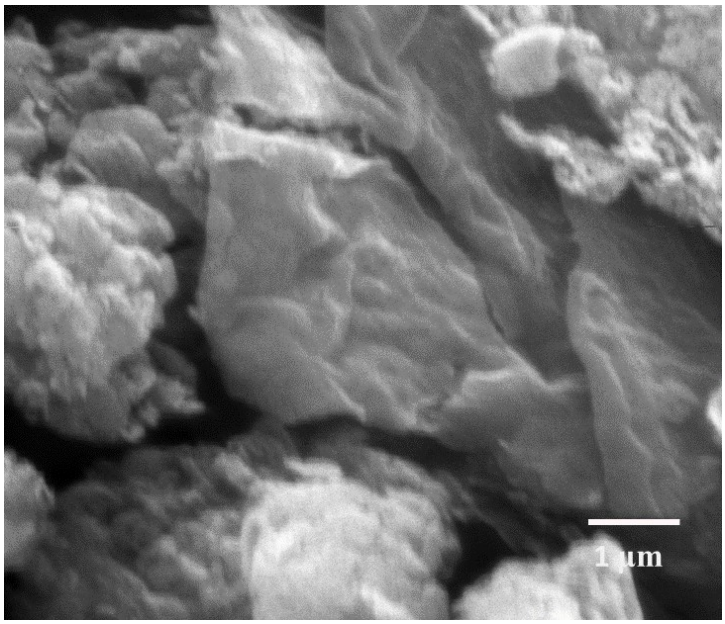

Fig S2. FESEM image of g-C_3N_4 prepared by the usual condensation of melamine alone

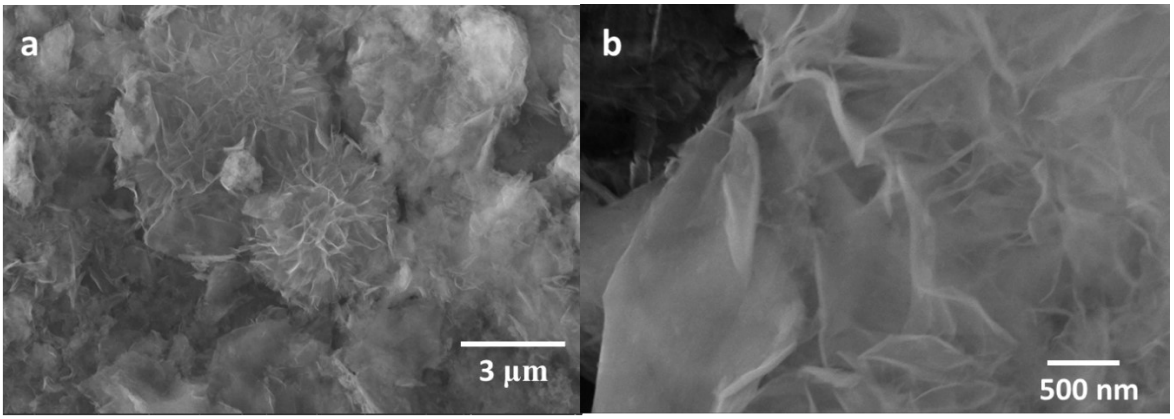

Fig S3. FE-SEM images of NiV LDH

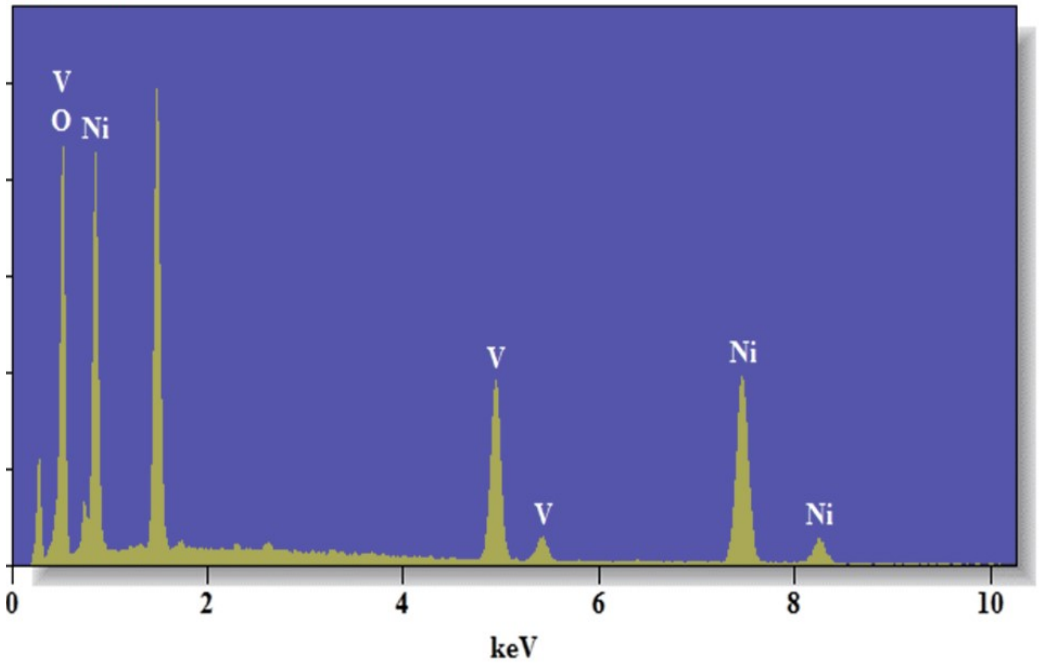

Fig S4. EDAX spectrum of NiV LDH

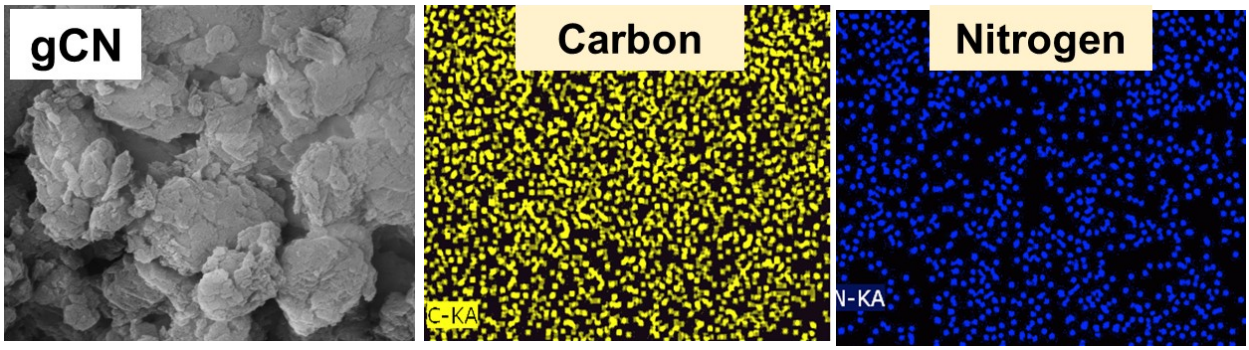

Fig S5. EDAX maps of gCN

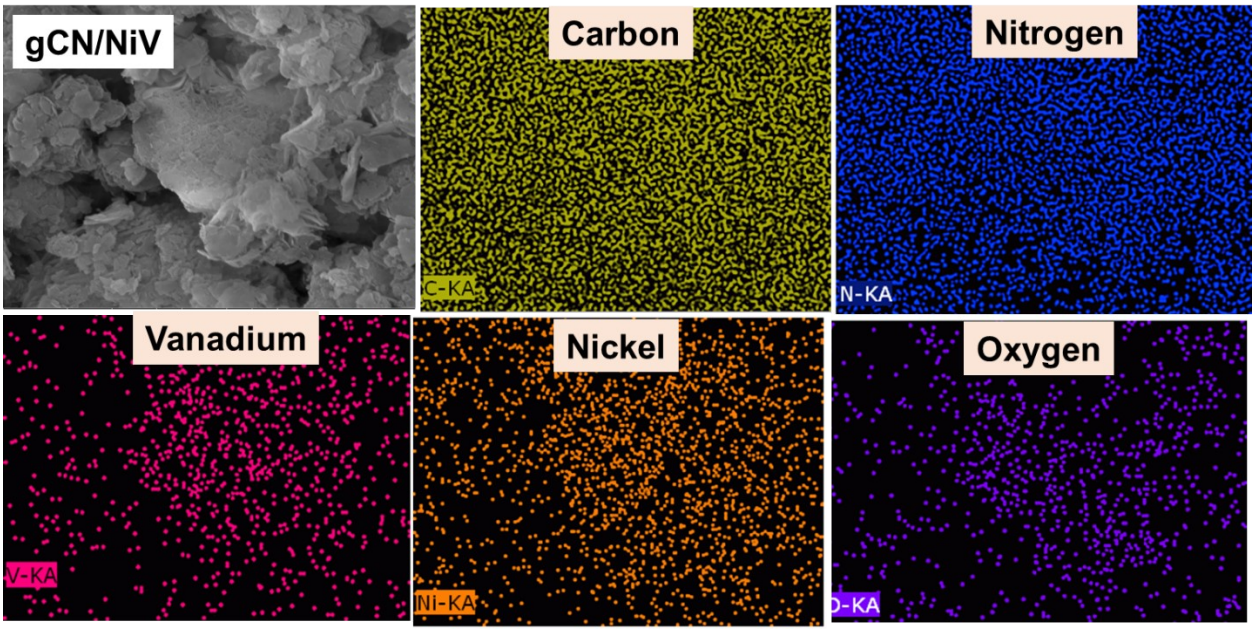

Fig S6. EDAX maps of S-gCN/NiV

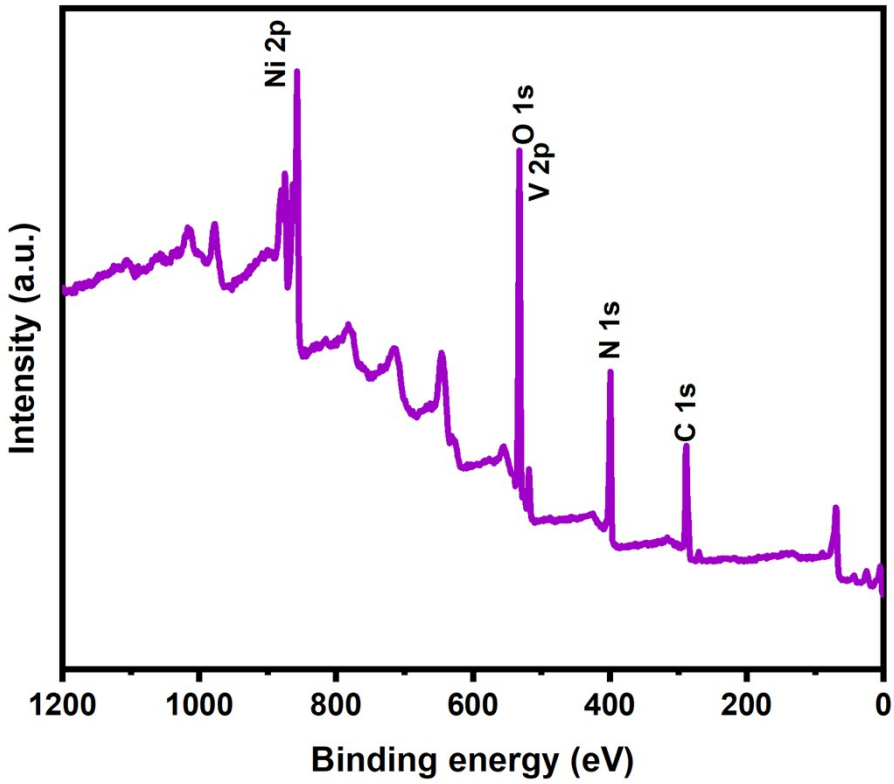

Fig S7. XPS survey spectrum of S-gCN/NV composite

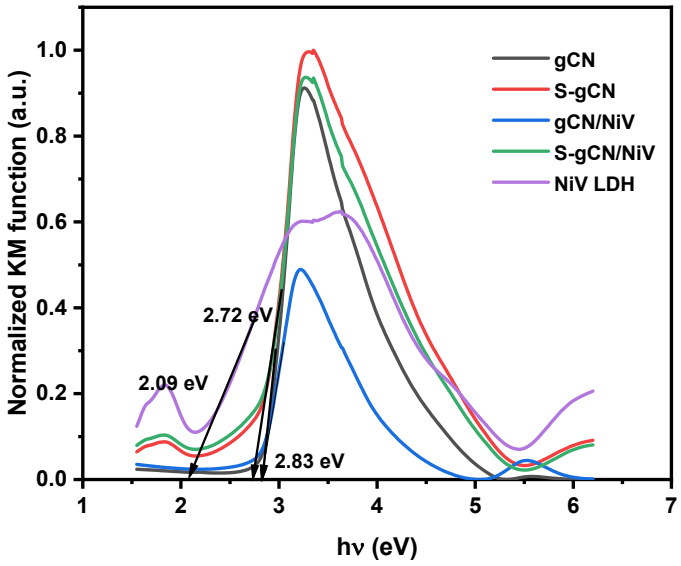

Fig S8. KM plots of the prepared samples, obtained from UV DRS analysis

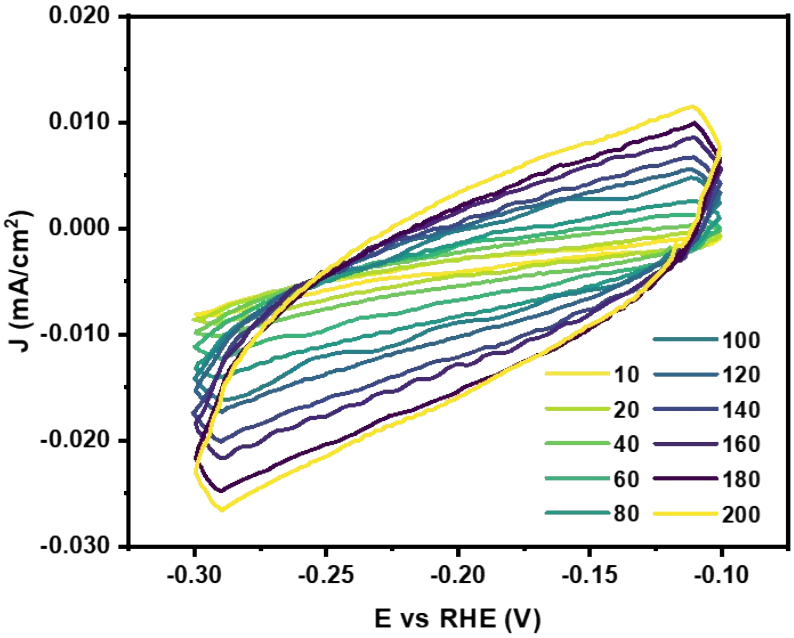

Fig S9. CV curves of gCN recorded in the non-faradic region at different scan rates

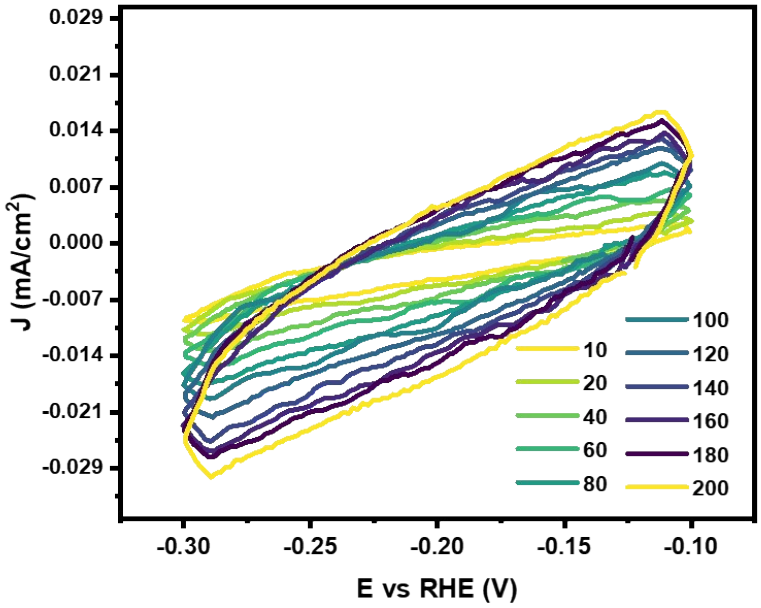

Fig S10. CV curves of S-gCN recorded in the non-faradic region at different scan rates

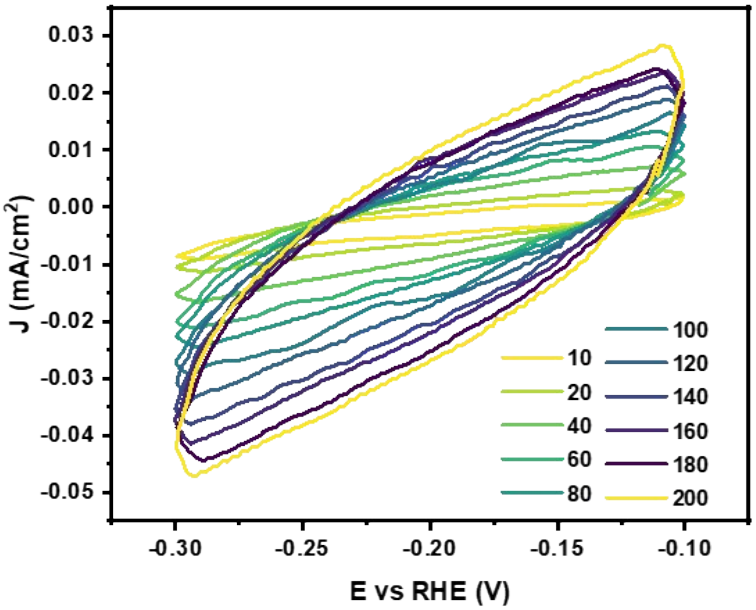

Fig S11. CV curves of gCN/NV recorded in the non-faradic region at different scan rates

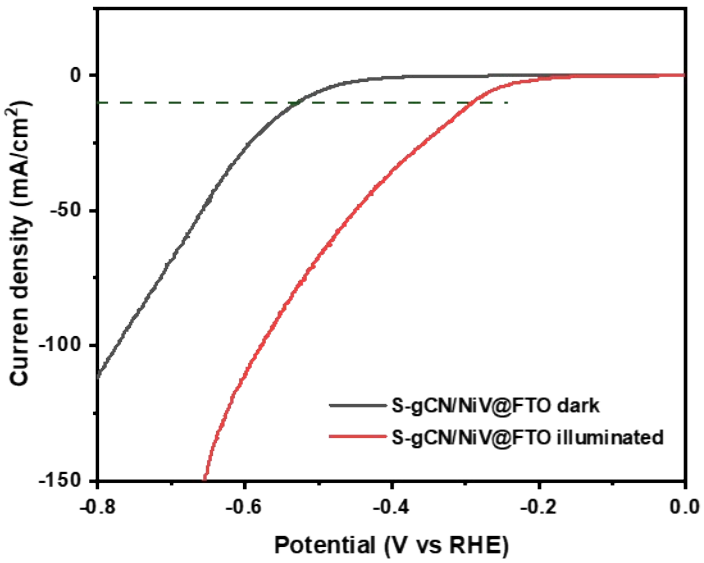

Fig S12. LSV curves of S-gCN/NiV recorded in 0.5 M H_2SO_4 under dark and illuminated conditions

Table S2. Comparison of activity parameters of current work with related works

Material	Overpotential	Tafel slope	Stability	Electrolyte	Ref.
Ni-Mn LDH/g-C_3N_4	**147 mV at 60 mA/cm^2**	**63 mV**	**12 h**	**1 M KOH**	[1]
CoMn LDH@g-C_3N_4	**406 mV at 10 mA/cm^2**	**90 mV**	**12 h**	**1 M KOH**	[2]
g-C_3N_4@NiMn-LDH	**600 mV at 10 mA/cm^2**	**125 mV/dec**	**N/A**	**1 M KOH**	[3]
Mo_2C@g-C_3N_4@NiMn-LDH	**116 mV at 10 mA/cm^2**	**95 mV/dec**	**24 h**	**1 M KOH**	[3]
S-gCN/NiV	**560 mV at 10 mA/cm^2**	**79 mV/dec**	**8 h**	**0.5 M H_2SO_4**	**Current work**

References:

1 M. Shakeel, M. Arif, G. Yasin, B. Li and H. D. Khan, *Appl Catal B*, 2019, **242**, 485–498.

2 M. Arif, G. Yasin, M. Shakeel, X. Fang, R. Gao, S. Ji and D. Yan, *Chem Asian J*, 2018, **13**, 1045–1052.

3 B. Zhang, J. Li, Q. Song and H. Liu, *Int J Energy Res*, 2022, **46**, 12406–12416.