Supporting Information

Title: Dynamic Charge transfer through Fermi Level Equilibration in p-$CuFe_2O_4$/ n-NiAl LDH interface towards photocatalytic application

Snehaprava Das, SulagnaPatnaik and K. M. Parida*

Center for Nano Science and Nano Technology SOA Deemed to be University, Bhubaneswar-751030,Odisha(India)

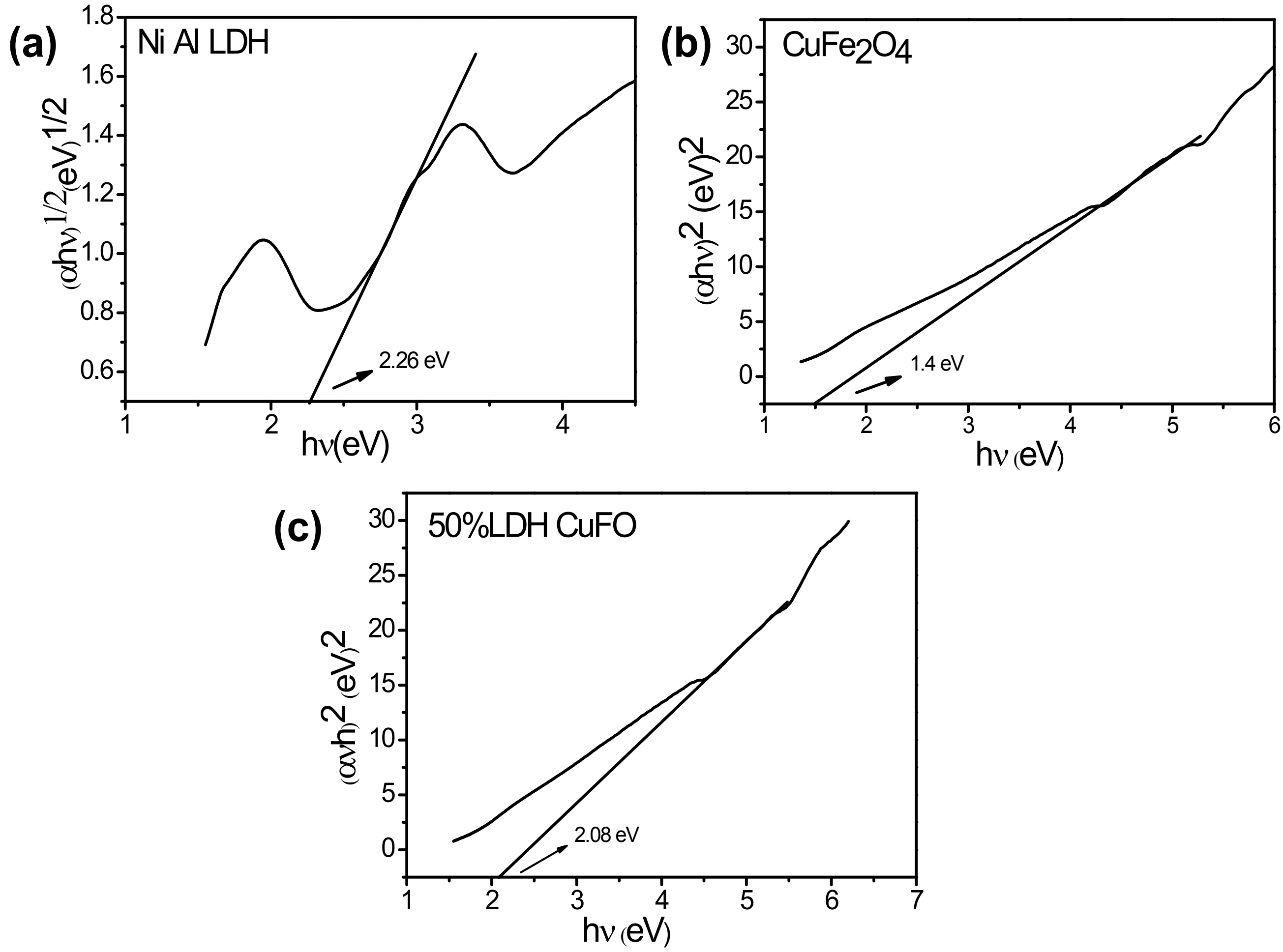

Fig. S1 Band gap energy values assessed from UV-vis DRS of (a) neat Ni Al LDH, (b) CuFO, and (c) 50% LDH-CuFO

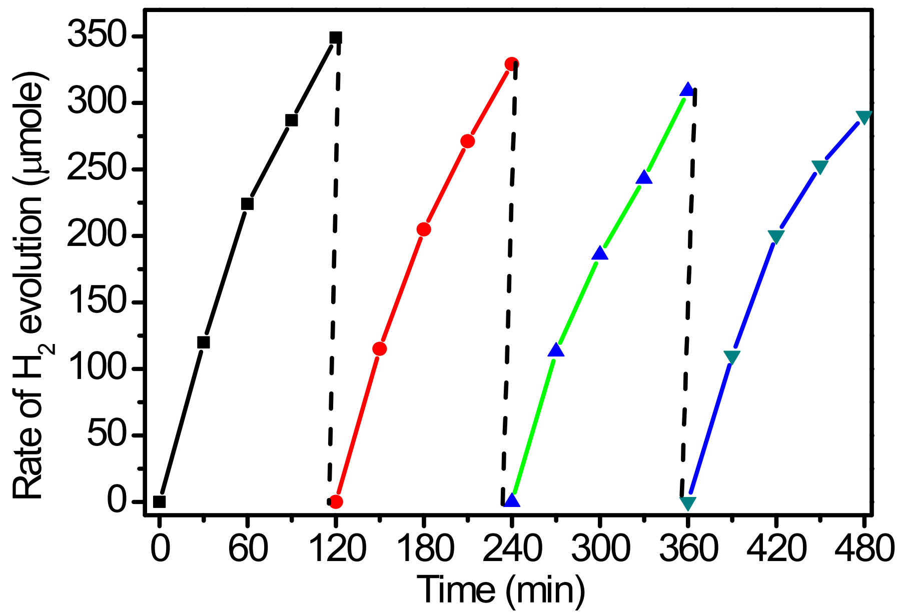

Fig. S2 Reusability test of the photocatalyst towards H_2production after four successive cycles in 60 min interval with catalyst 50% LDH-CuFO

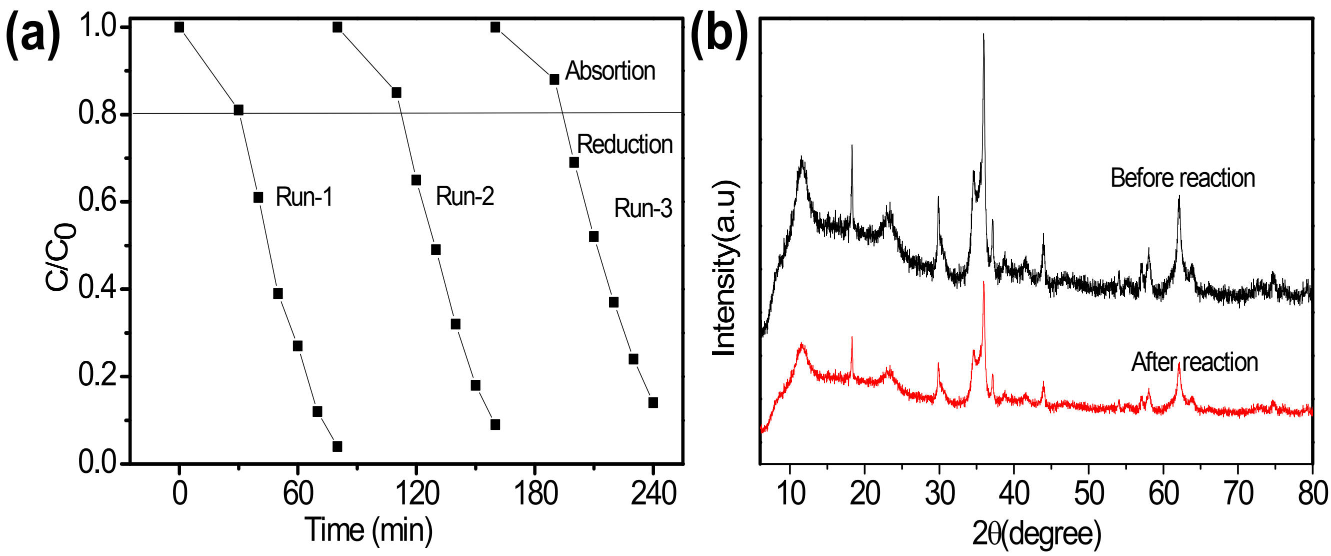

Fig. S3 Reusability test of the photocatalyst towards (a) Cr (VI) reduction in 60 min. (b) XRD after reaction.

Table S1: Rate constant (k) and Regression co-efficient (R^2) values of the synthesized samples in Cr (VI) reduction

Photocatalyst	Rate Constant(k)	R^2
Ni Al LDH	0.01229	0.9638
$CuFe_2O_4$	0.00359	0.9520
40% LDH-CuFO	0.01821	0.9856
50%LDH-CuFO	0.04464	0.9912
60%LDH-CuFO	0.01484	0.9849

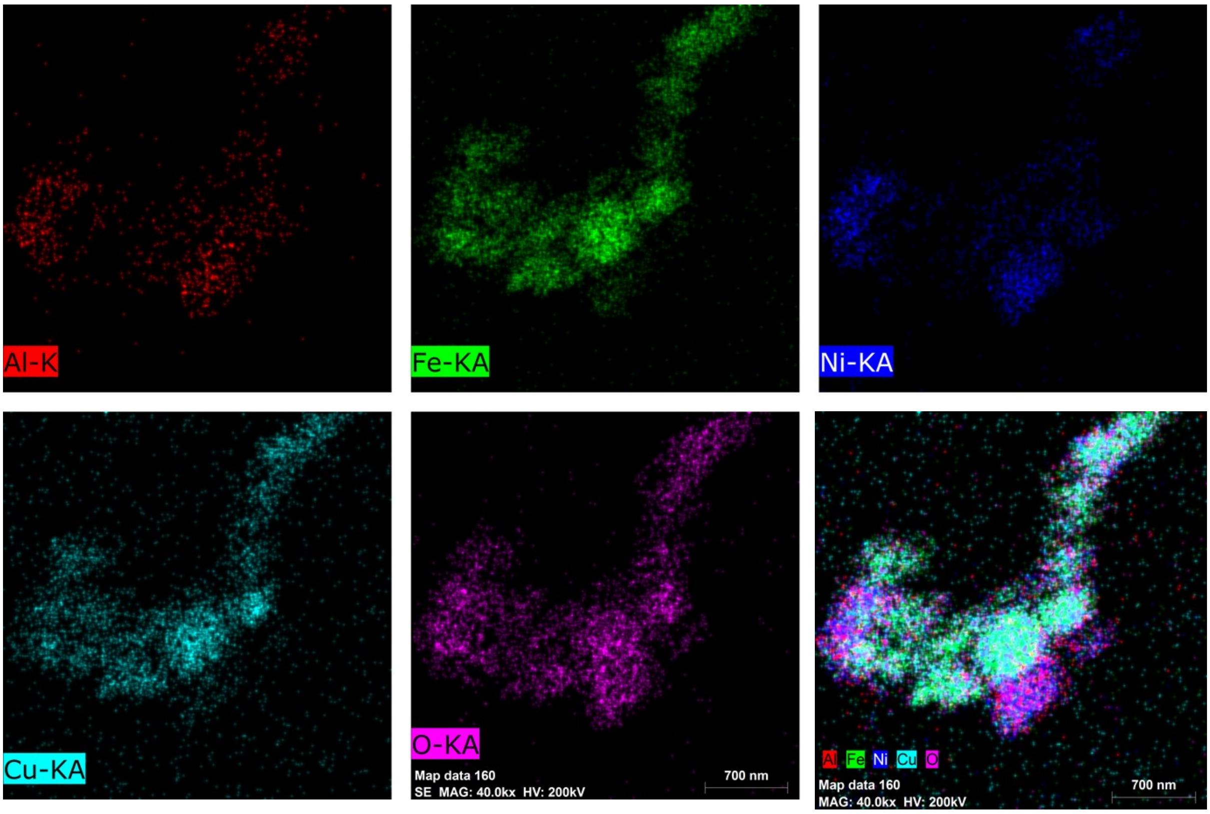

Fig. S4 Colour elemental mapping of 50% LDH-CuFO

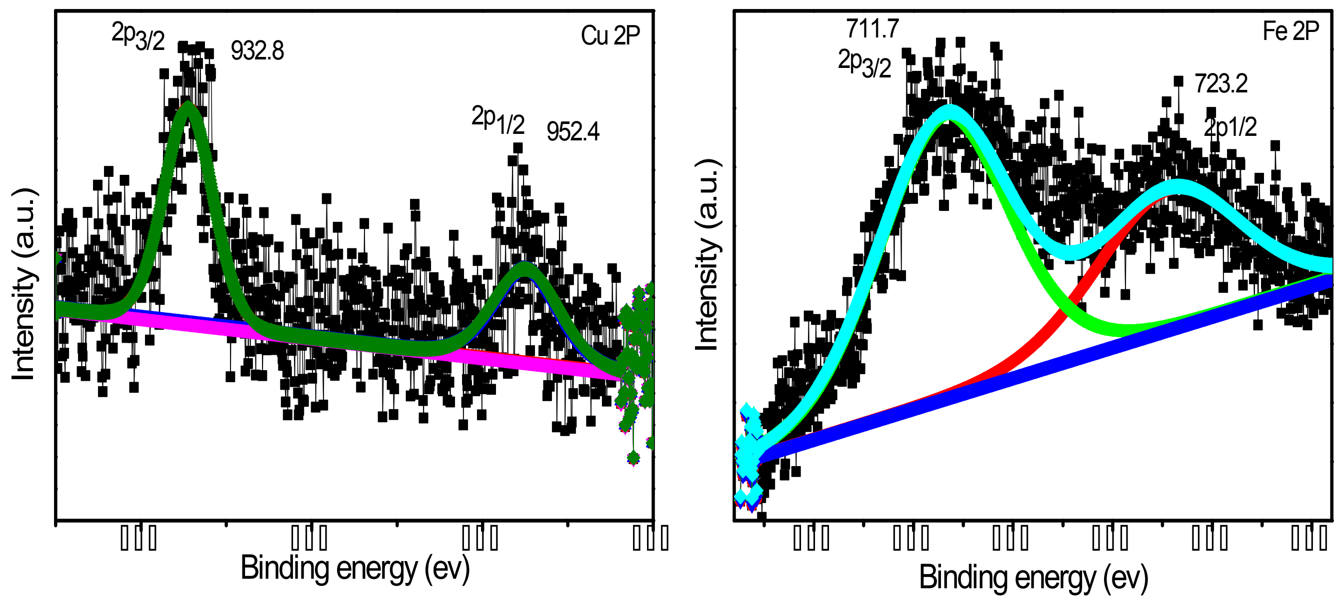

Fig. S5 XPS spectra of 50% LDH-CuFO after photocatalytic experiment.

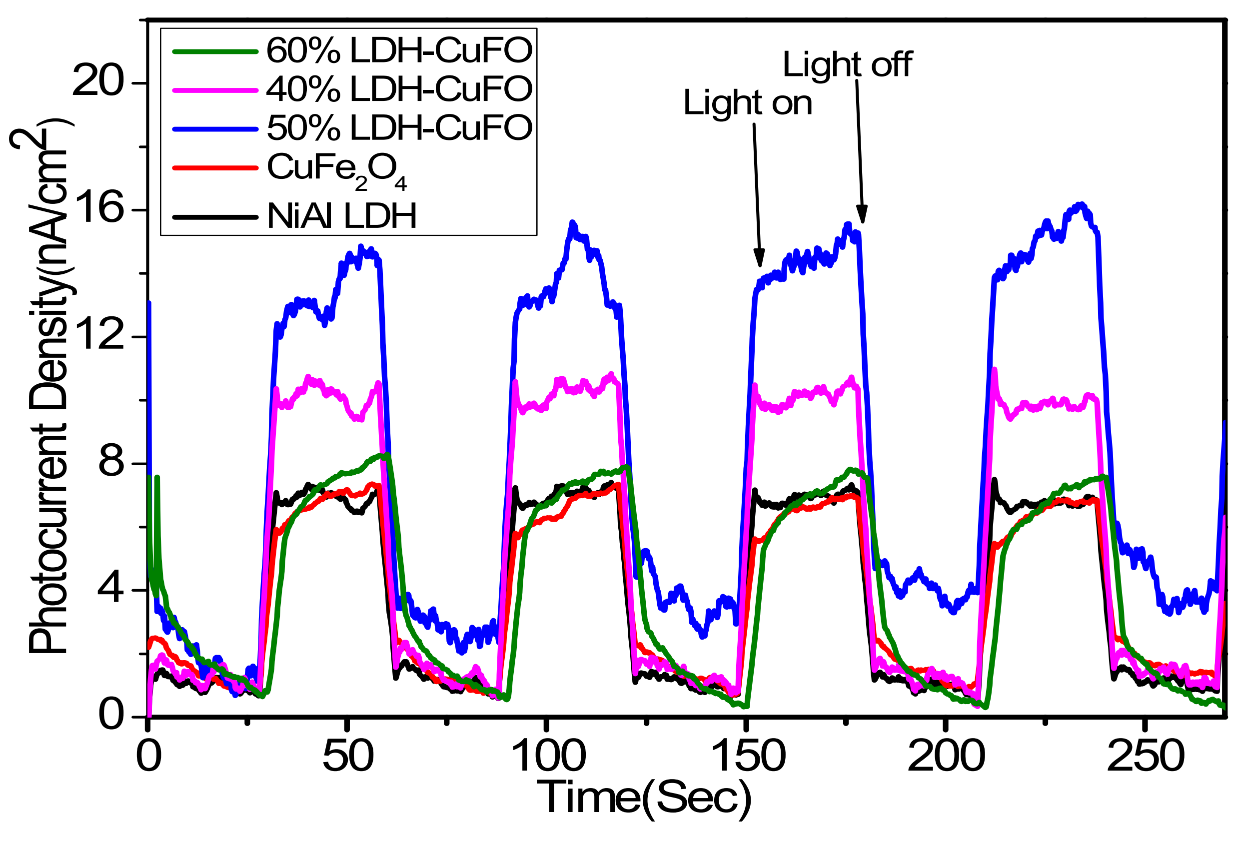

Fig. S6 Transient photocurrent study of NiAl LDH, $CuFe_2O_4$ and X% LDH-CuFO .

Catalytic system	Concentration of	Light	Preparation	Catalytic	pH	Results	Refs

Catalytic system	UV-vis light Source	Preparation Method	Incident light	Sacrificial agents	H2 evolution (μ mol $g^{-1}h^{-1}$)	Ref.
CdS/ZnCr LDH	450 W Xenon	Expoliation	λ> 420	Na_2SO_3+Na_2S	374	1
FeMgAl LDH	125 W mercury	Coprecipitation	λ> 420	CH_3OH	493	2
NiZnCr LDH	125 W mercury	Coprecipitation	λ> 420	CH_3OH	1915	3
$Zn_xCd_{1-x}S$ nanosheet/ ZnCdAl LDH	300W Xenon	Impregnation	λ> 420	Na_2S/Na_2SO_3	6690	4
NiCo LDH/p doped CdS	300W Xenon	In-situ hydrothermal	λ> 420	Na_2S/Na_2SO_3	8665	5
CdS/NiFe LDH	300W Xenon	In-situ growth	λ> 420	CH_3OH	469	6
Ni Al LDH/$CuFe_2O_4$	125 W mercury	Coprecipitation	λ> 420	CH_3OH	15385	Present work

Table S2: Comparison of H_2 Evolution values by Different LDH-modified Nano composites

Table S3: A comparative study of Cr(VI) reduction at different pH over heterostructure 50% NiAl LDH-CuFO with other reported material

	Cr(VI)	source	method	activity time(h)		(%)	
FeOOH/RGO	10 ppm	Visible light	in situ hydrothermal	3	2	94	7
MnO2@RGO	10 ppm	Visible light	in situ hydrothermal	2	2	97	8
Formate ion containing g-C3N4	20ppm	Visible light	in situ hydrothermal	4	5	55	9
50% NiAl LDH-$CuFe_2O_4$	20ppm	Visible lights	Co-Precipitation followed by sol gel	1	5.2	93	Present work

References

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