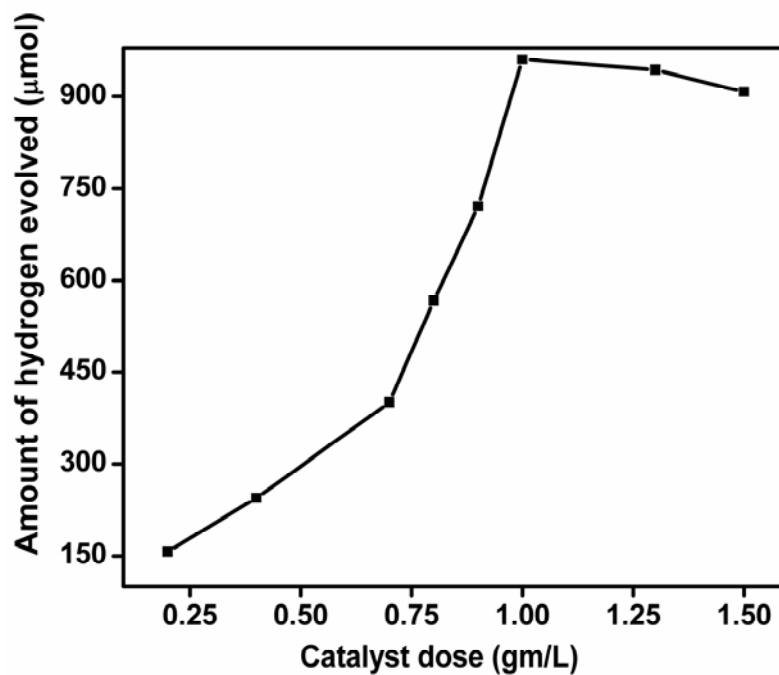


## Supplementary Information

### **Design and development of visible light harvesting Ni-Zn/Cr-CO<sub>3</sub><sup>2-</sup> LDH system for hydrogen evolution**

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**Figure S1.** Volume of hydrogen evolution obtained for Ni+Zn/Cr LDH with different catalyst doses for 1 h.

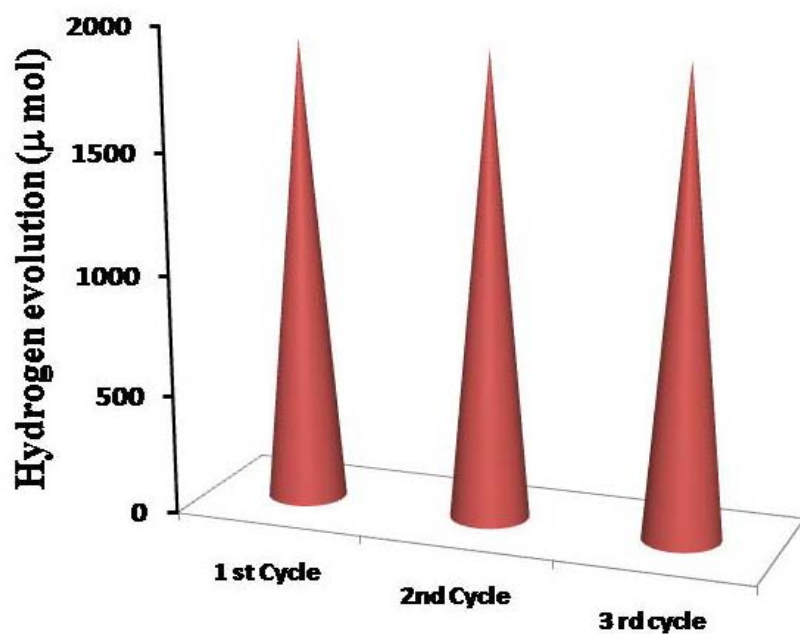


Figure S2. Reusability study over LDH4 material.

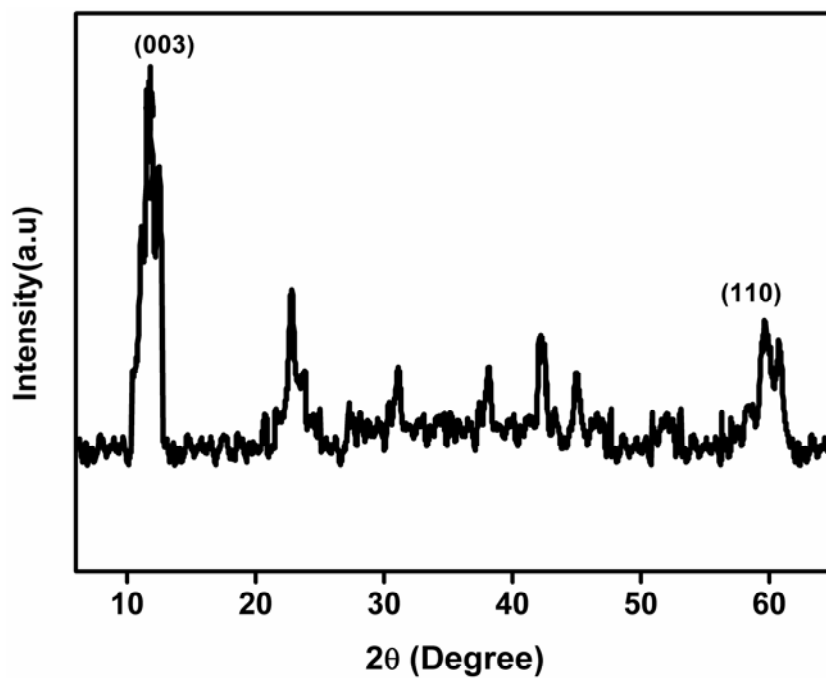


Figure S3. XRD pattern of recycle LDH4 material.

## Table captions

**Table S1.** Cell parameters, crystallite size, BET surface area, pore volume, pore diameter for different LDHs

<sup>a</sup>Calculated from XRD patterns and <sup>b</sup>measured from N<sub>2</sub> adsorption-desorption isotherms, <sup>c</sup>calculated by diffuse reflectance spectra.

**Table S1.**

Samples	lattice parameter <sup>a</sup> d <sub>110</sub> = a (nm)	crystallite size <sup>a</sup> D (nm)	BET Surface Area <sup>b</sup> (m <sup>2</sup> /g)	Total pore volume <sup>b</sup> (cm <sup>3</sup> /g)	Average pore diameter <sup>b</sup> nm	Band gap energy <sup>c</sup> eV
Zn/Cr LDH	3.5	17	53.2027	0.190567	12.1412	2.4
Zn/ Ni (25)/Cr	3.52	18	62.3729	0.353652	12.9967	2.3
Zn/ Ni (50)/Cr	3.54	20	81.1072	0.226261	14.8867	2.2
Zn/ Ni (75)/Cr	3.57	21	83.9770	0.264484	15.3788	2.1
Ni/Cr LDH	3.58	25	105.6184	0.335170	17.8359	2.05

**Table S2.** The chemical composition of all as prepared LDHs was determined using atomic absorption spectroscopy

**Table S2.**

<u>LDH</u>	<u>Materials</u>	<u>Composition</u>
HT1	Zn <sub>1.32</sub>	Ni <sub>0</sub> Cr <sub>0.066</sub>
HT2	Zn <sub>0.098</sub>	Ni <sub>0.033</sub> Cr <sub>0.067</sub>
HT3	Zn <sub>0.06</sub>	Ni <sub>0.065</sub> Cr <sub>0.066</sub>
HT4	Zn <sub>0.032</sub>	Ni <sub>0.099</sub> Cr <sub>0.066</sub>
HT5	Zn <sub>0</sub>	Ni <sub>1.33</sub> Cr <sub>0.065</sub>