Supporting Information

Facile development of CoAl-LDHs/RGO nanocomposites as photocatalysts for efficient hydrogen generation from water splitting under visible-light irradiation

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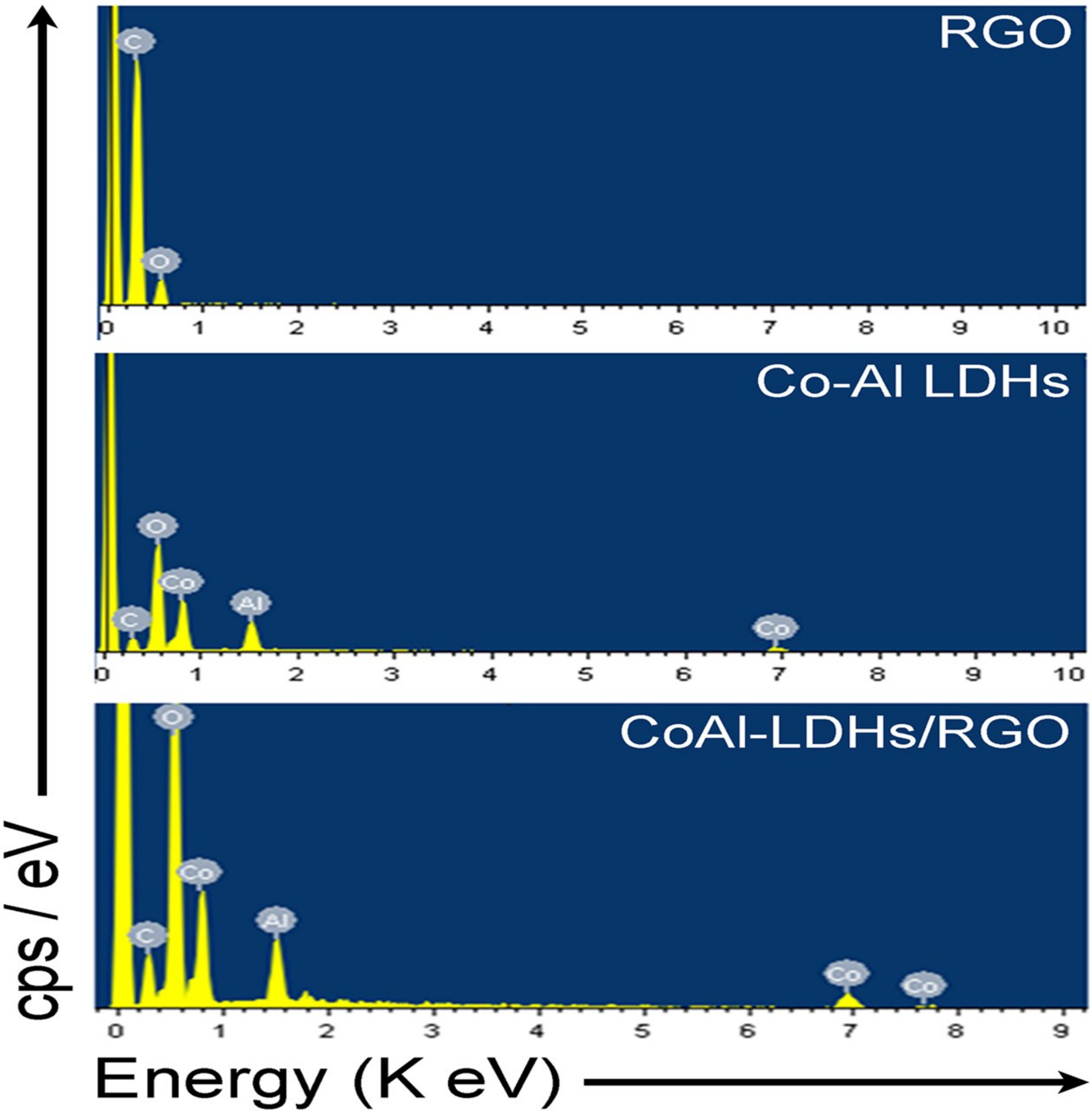

Fig. S1 EDX spectra of the pure RGO, pure CoAl-LDHs and optimized CoAl-LDHs/RGO nanocomposites

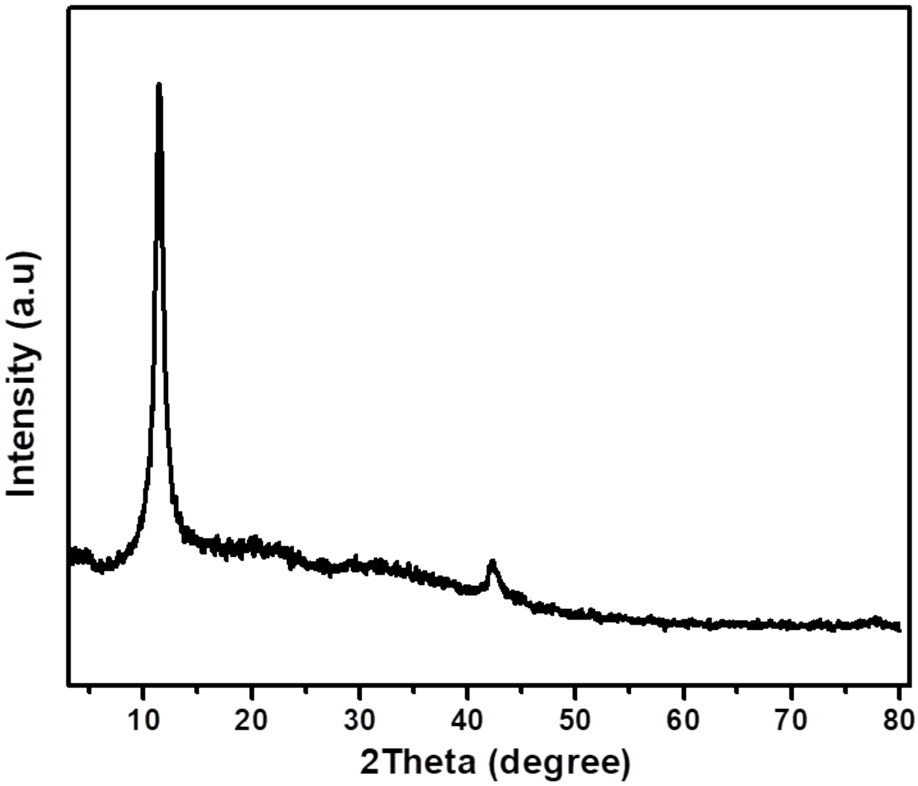

Fig. S2 XRD pattern of GO

Table S1 Photocatalytic H_2 evolution performance of the as-synthesized different samples in presence of $Ru(bpy)_3]Cl_2{\cdot}6H_2O$ photosensitizer under visible-light irradiation($\lambda \geq 420$ nm).

S.No	**Photocatalyst**	**Ratio of Grams**	**Solvent**	**H_2 evolution rate (μmol $h^{-1}g^{-1}$)**
1	-	-	CH_3CN+ TEOA +H_2O	0
2	Pure CoAl-LDHs	0.8	CH_3CN+TEOA	21.74
3	Pure CoAl-LDHs	0.8	CH_3CN+ TEOA +H_2O	430.14
4	Pure RGO	0.055	CH_3CN+ TEOA +H_2O	0
5	CoAl-LDHs/RGO-35	0.8:0.039	CH_3CN+ TEOA +H_2O	1310.20
6	CoAl-LDHs/RGO-50	0.8:0.055	CH_3CN+ TEOA +H_2O	1571.84
7	CoAl-LDHs/RGO-75	0.8:0.075	CH_3CN+ TEOA +H_2O	708.167
8	CoAl-LDHs/RGO-100	0.8:0.105	CH_3CN+ TEOA +H_2O	544.18

The quantum efficiency of H_2 evolution was estimated using Equation (1) (Ref: Angew. Chem. **2016**, 128, 1824 –1828):

$$\Phi_{H_2} = 2\times\frac{moles\ of\ hydrogen\ evolved}{moles\ of\ the\ incident\ photons} \qquad \text{Equation (1)}$$

The external quantum efficiency values for H_2 generation were determined at 450 nm using a band pass filter with the same watersplitting experimental setup. The flux of incident photons from the power was measured by a power meter (PM100D, Thorlabs). The lamp intensity at 450 nm was 37.3 mW/cm^2, the illuminatied area ws 18.08 cm^2, and the incident photon flux was calculated to be 5.50*10^{21} h^{-1}. The quantum efficiency of H_2 generated at

450 nm for pure CoAl-LDHs, RGO, (CR-1) CoAl-LDHs/RGO-35, (CR-2) CoAl-LDHs/RGO-50, (CR-3) CoAl-LDHs/RGO-75, (CR-4) CoAl-LDHs/RGO-100 were estimated as followed: 0.26%, 0.81%, 0.98%, 0.43%, 0.32%.