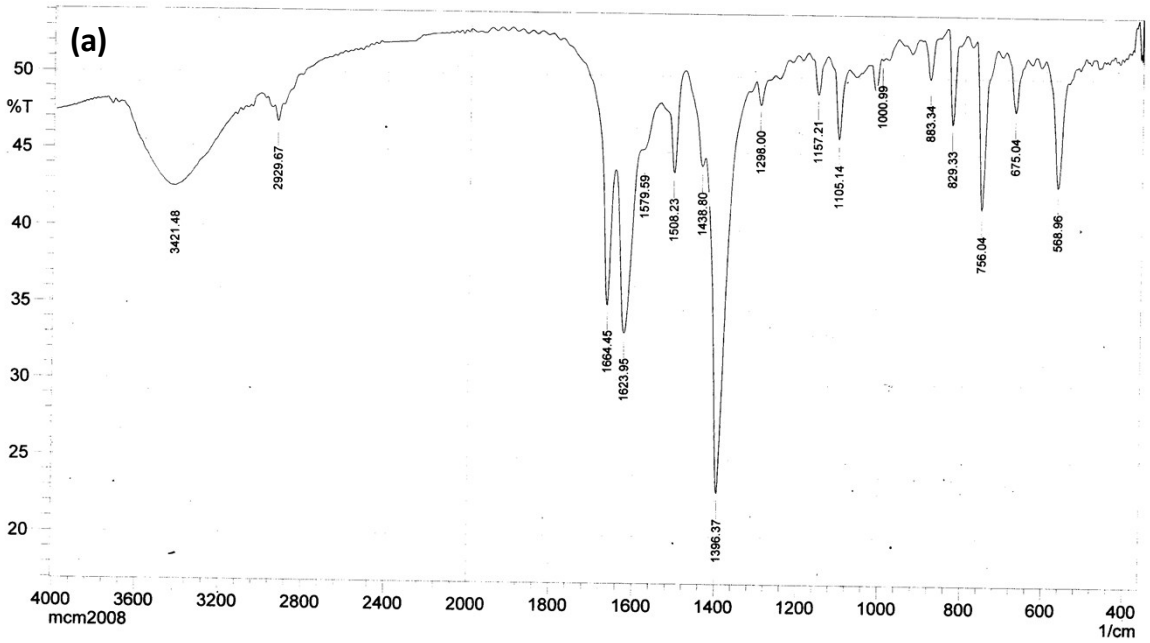
Supporting information

Manifestation of MOF templated Cu/CuO@TiO_2 nanocomposite for synergistic hydrogen production

Reagents

All the reagents used were analytical grade and used without further purification. Titanium isopropoxide (95%) was purchased from alfa aesar, USA. Copper (II) nitrate, trihydrate (puriss. p.a., 99-100%) and dry DMF (anhydrous, 99.8%) was purchased from Sigma Aldrich, USA. Benzene 1,4 dicarboxilic acid was purchased from SRL, India. Ethanol and Methanol both were used as the solvent without further purification and deionised water (DI) was used throughout the experiment.



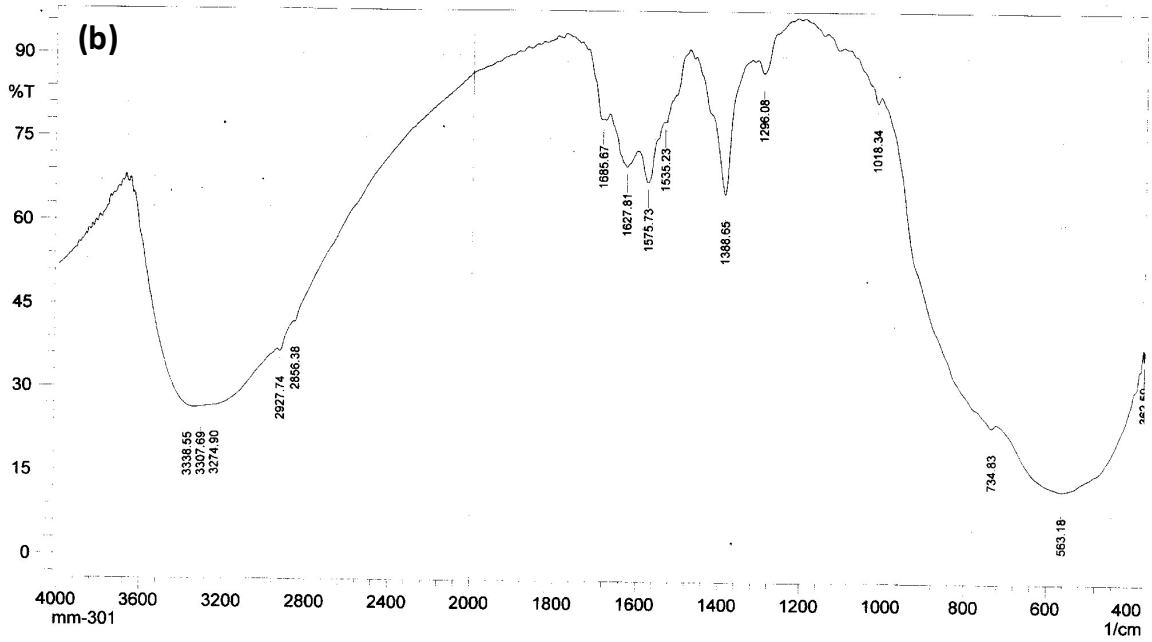


Figure S1. FTIR spectra of (a) Cu-BDC and (b) Cu-BDC@Ti(OH)$_{n.}$

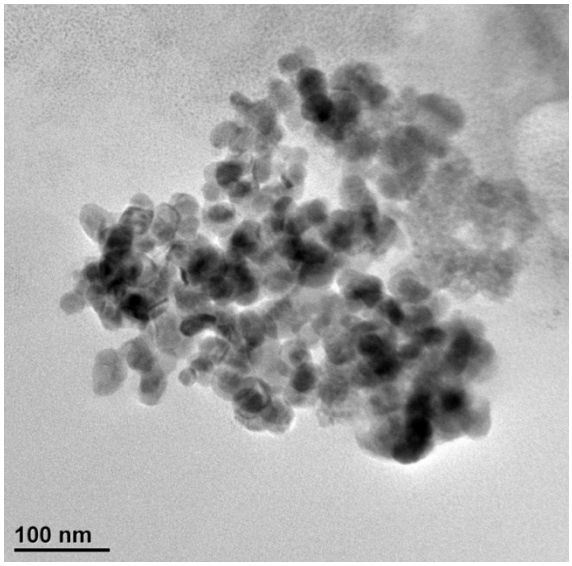


Figure S2. HRTEM image of Cu-BDC

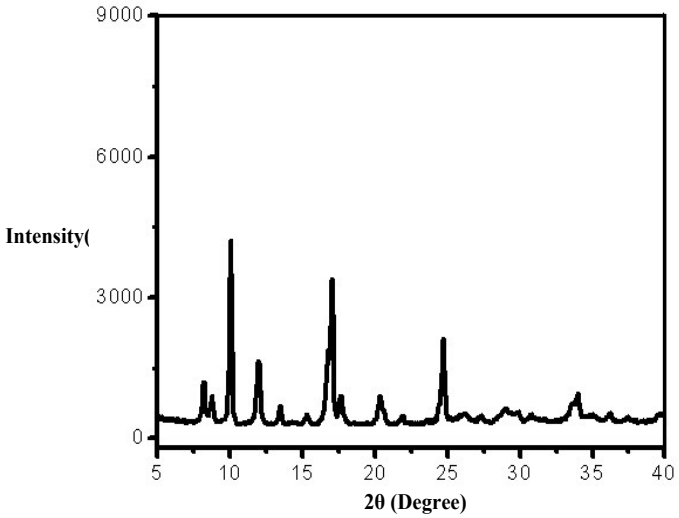


Figure S3. Powder XRD pattern of Cu-BDC.

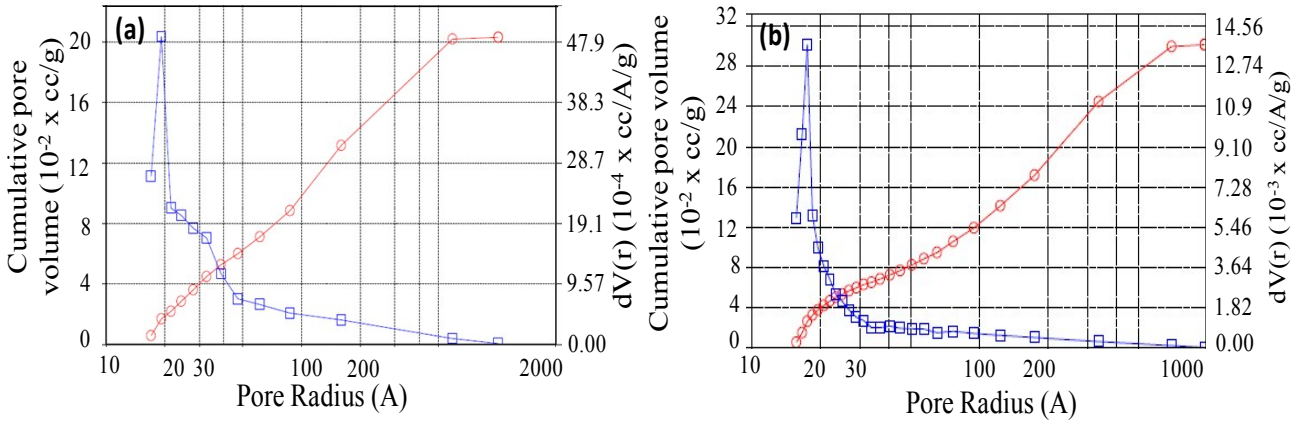


Figure S4. Pore size distribution curve for (a) CMT(3)-350 and (b) CMT(3)-450

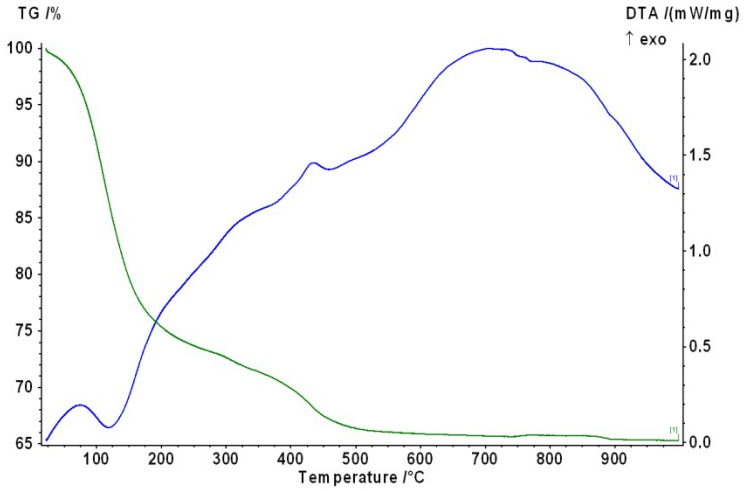


Figure S5. TG-DTA of Cu-BDC@Ti(OH)$_n$ (before heat treatment).

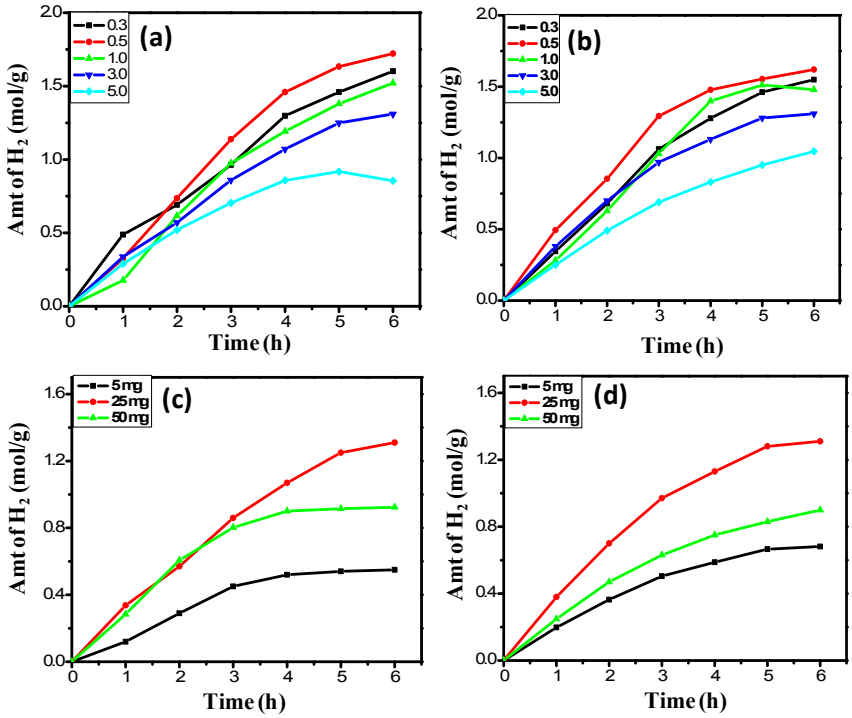


Figure. S6 Time courses of photocatalytic H_2 evolution over a), b) different wt% Cu loaded CMT(x)-350 and CMT(x)- 450 in MeOH as SED (15% v/v) c), d) different amount of CMT(3)-350 and CMT(3)-450 in MeOH as SED (15% v/v).

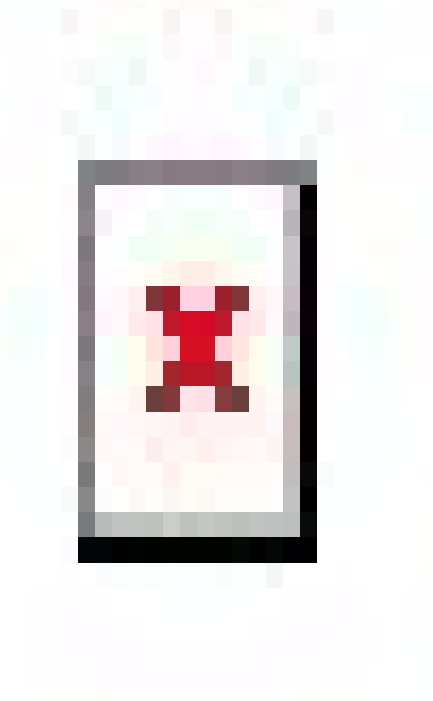


Figure S7 Digital image of Pyrex glass reactor.

Table S1. AQY for H_2 production of different wt% Cu loaded CMT(x)-350 and 450.

Cu wt% (x)	**Amt of H_2 production (%AQE) over CMT(x)-350**	**Amt of H_2 production %AQE) over CMT(x)-450**
0.3	9.76	9.39
0.5	10.49	9.88
1.0	9.27	8.96
3.0	7.99	7.74
5.0	5.18	4.82

Table S2. AQY for H_2 production for different amount of CMT(3)-350 and 450 in MeOH (15% v/v).

Amt of the catalyst (mg)	Amt of H_2 production (%AQE) over CMT(3)-350	Amt of H_2 production (%AQE) over CMT(3)-450
5	3.35	4.14
25	7.99	7.74
50	5.73	5.49

Table S3. AQY for H_2 production of CMT(3)-350 and 450 in different SED (15% v/v)

SED	Amt of H_2 production (%AQE) over 25 mg CMT(3)-350	Amt of H_2 production (%AQE) over 25 mg CMT(3)-450
MeOH	7.99	7.74
EtOH	7.2	5.91
TEOA	5.30	4.94
EDTA	4.88	3.96

Table S4. Amount of elemental component in CMT(3)-350 analyzed form FESEM-EDXS

Element	Weight%
O K	76.21
Ti K	20.6
Cu K	3.19
Totals	100.00

Table S5. Results of ICP analysis

Catalyst	Amt. of Cu	Amt. of Ti
CMT(1)-350	1.30 wt%	65.83 wt%
CMT(3)-350	3.20 wt%	57.32 wt%