

Supporting Information

Figure SI-I

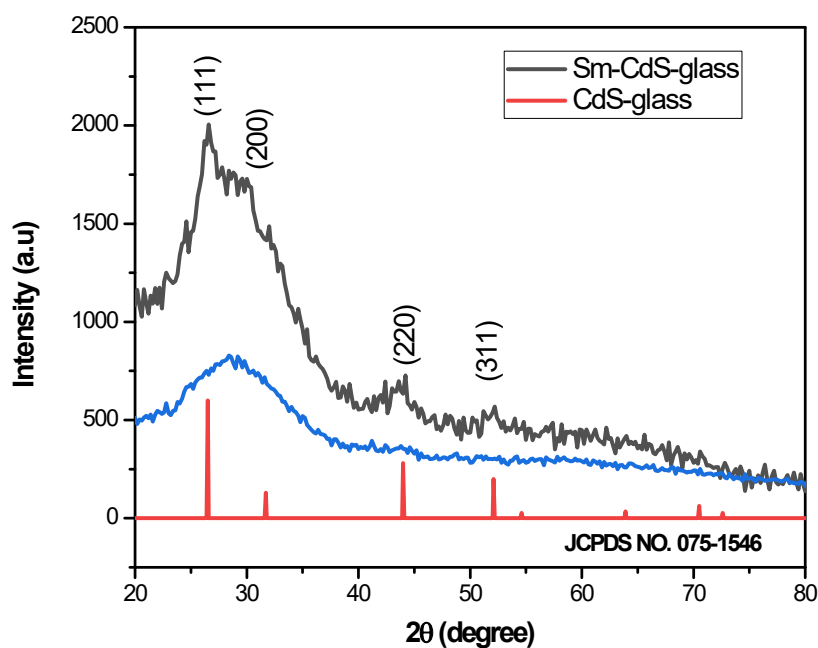


Figure SI-I; XRD pattern of CdS and Sm doped CdS in glass matrix.

Figure SI-II

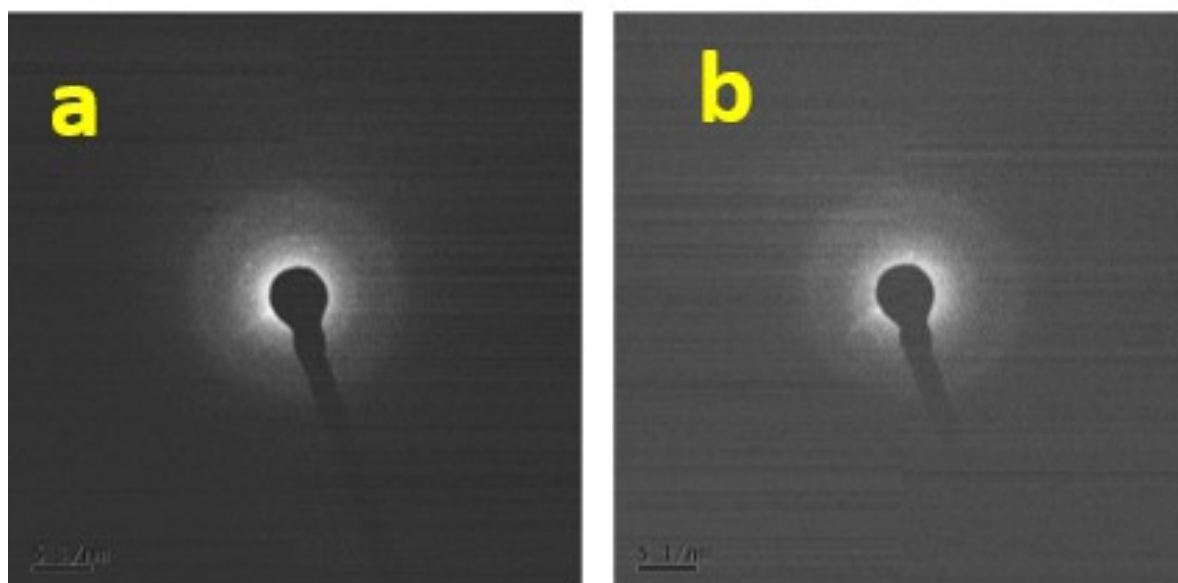


Figure SI-II: SAED pattern of these CdS and 1 % Sm doped CdS in the glass matrix.

Figure SI-III

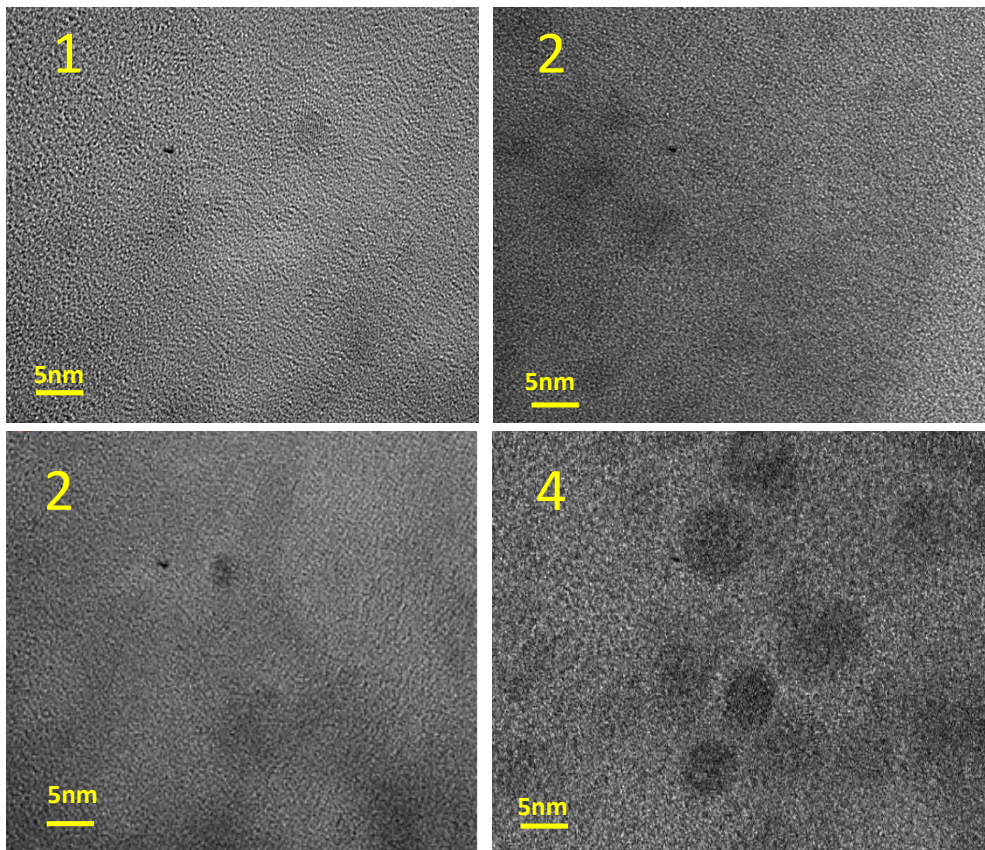


Figure SI-III: TEM images of 2%Sm CdS and 3 %Sm CdS doped glass at (1 & 2) 525 °C and (3&4) 575 °C

Figure SI-IV

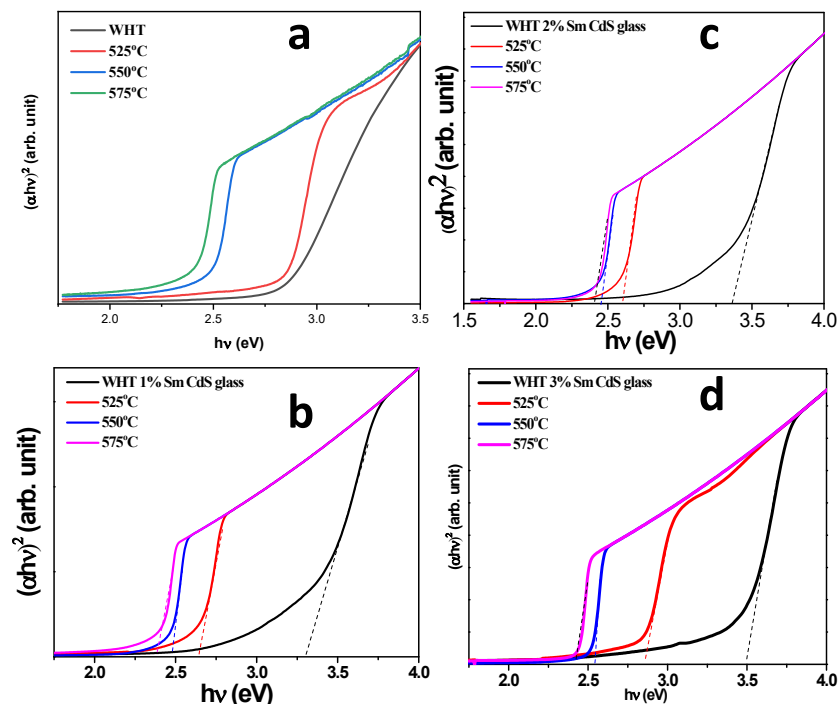


Figure SI-IV: Tauc Plot spectra for CdS (a), 1% Sm doped CdS (b), 2% Sm doped CdS (c) and 3% Sm doped CdS (d) in glass.

Figure SI-V

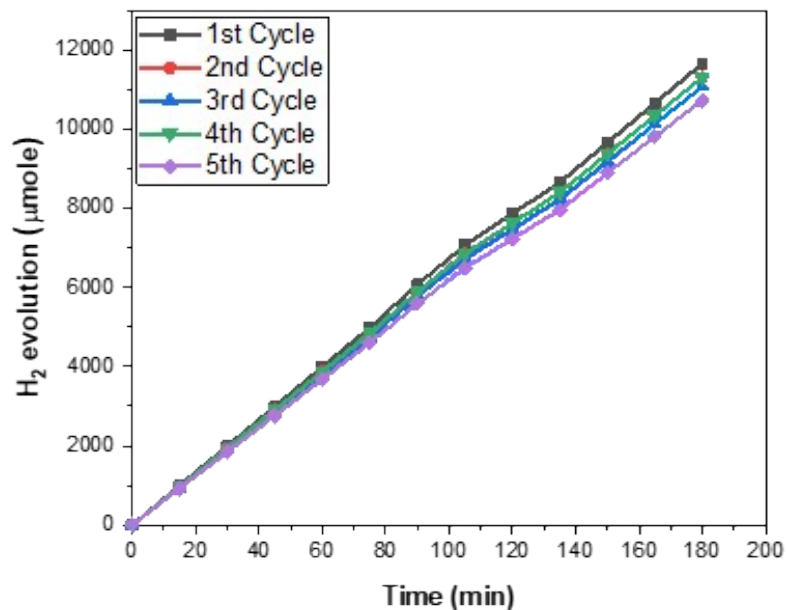


Figure SI-V: Stability study of the sample 1% Sm doped CdS in glass treated at 525°C.

Table SI-I

Table SI-I Comparisons of hydrogen evaluation rate with previously reported literature.

Sr. No.	composite	H ₂ in µmol/g/h	References
1.	CdS/WS ₂ /graphene	1840	Xiang Q, Cheng F, Lang D., Chem Sus Chem, 2016, 9: 996–1002.
2.	Mn ₁₃ -cluster/CdS	3600	Wen T, Zhang L, Schmitt W., Dalton Trans, 2018, 47: 10857–10860.
3.	CdS/Ti ₃ C ₂	2407	Xiao R, Zhao C, Zou Z, et al. Appl Catal B-Environ, 2020, 268: 118382.
4.	Ag ₂ S/CdS	777.3	RSC Adv. 2021, 16; 11(45): 28211–28222.
5.	Tb ³⁺ -doped CdS-550	3867	M. Al-Murish, V. Autade, E.Kumi-Barimah, R. Panmand, B. Kale, and A. Jha, ACS Appl. Energy Mater. 2023, 6, 17, 8875–8888.
6.	1%Sm CdS-550	3769.2	Present work.

Figure SI-VI

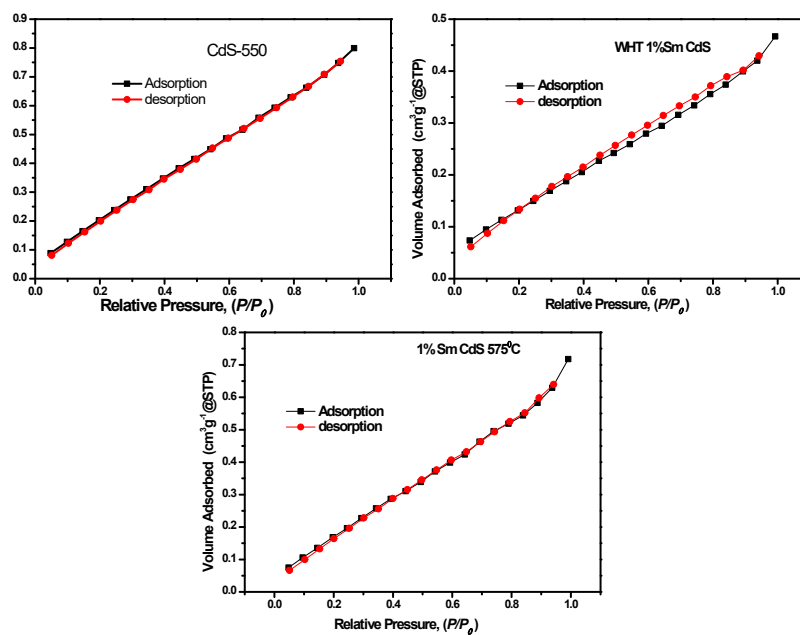


Figure SI-VI: BET Surface area of glass.

Table SI-II BET Surface are of glass samples

Sr. No.	Sample Code	BET Surface area (m ² /g ⁻¹)
1)	CdS	16.20
2)	1% Sm CdS	9.69
3)	1% Sm CdS-575°C	13.16

Figure SI-VII

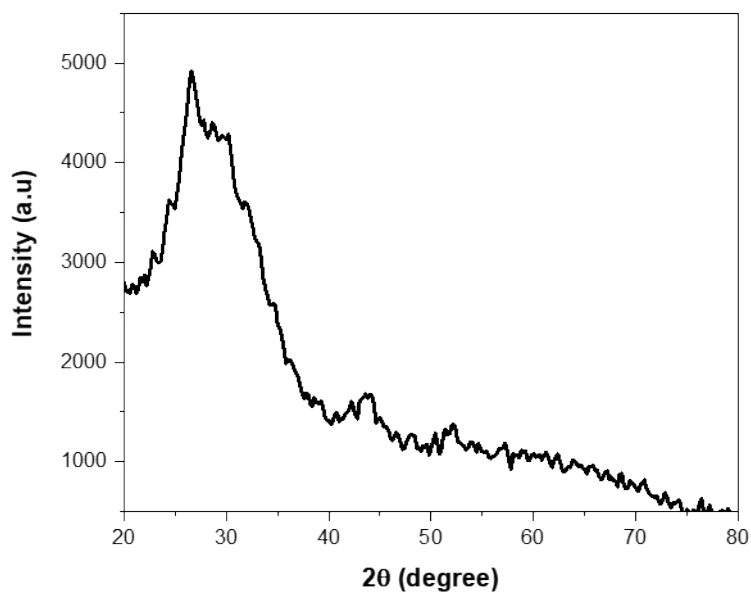


Figure SI-VI; XRD pattern of 1% Sm doped CdS in glass matrix 525°C after photocatalytic activity.