Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Eye readable gasochromic and Optical Hydrogen Gas Sensor Based on CuS-Pd

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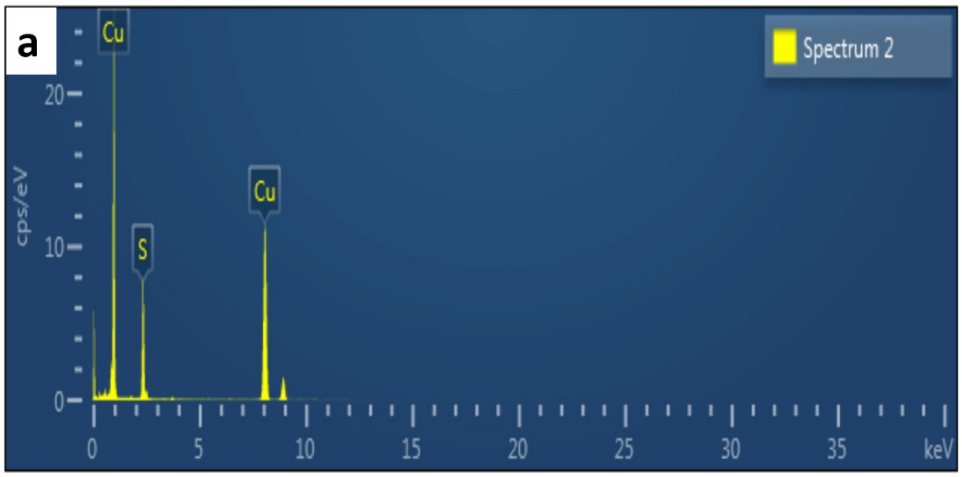
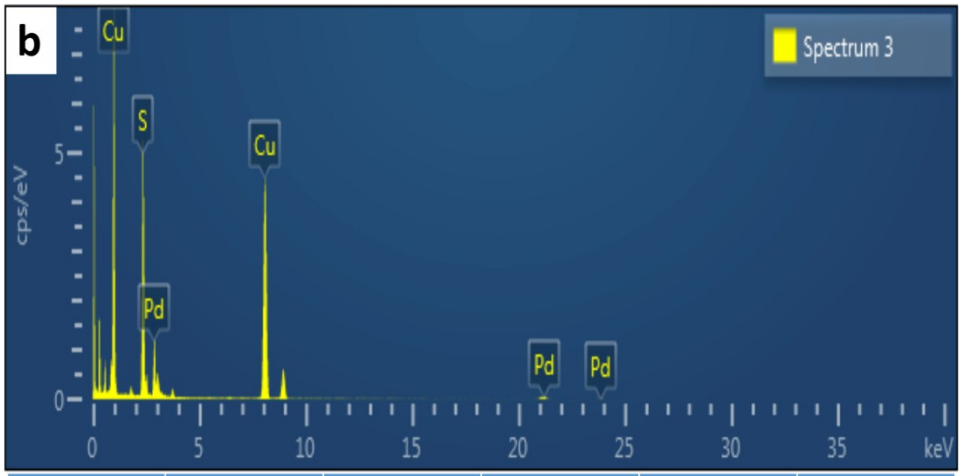


Element	Line Type	k factor	Absorption Correction	Wt%	Wt% Sigma
S	K series	0.98041	1.00	21.25	0.19
Cu	K series	1.42103	1.00	78.75	0.19
Total:				100.00	



Element	Line Type	k factor	Absorption Correction	Wt%	Wt% Sigma
S	K series	0.98041	1.00	27.13	0.43
Cu	K series	1.42103	1.00	60.01	0.78
Pd	K series	15.66306	1.00	12.86	1.05
Total:				100.00	

Figure S1. EDS spectra of synthesized CuS (a) and CuS-Pd nanohybrid. The higher wt% of Cu might be due to the Cu TEM grid.

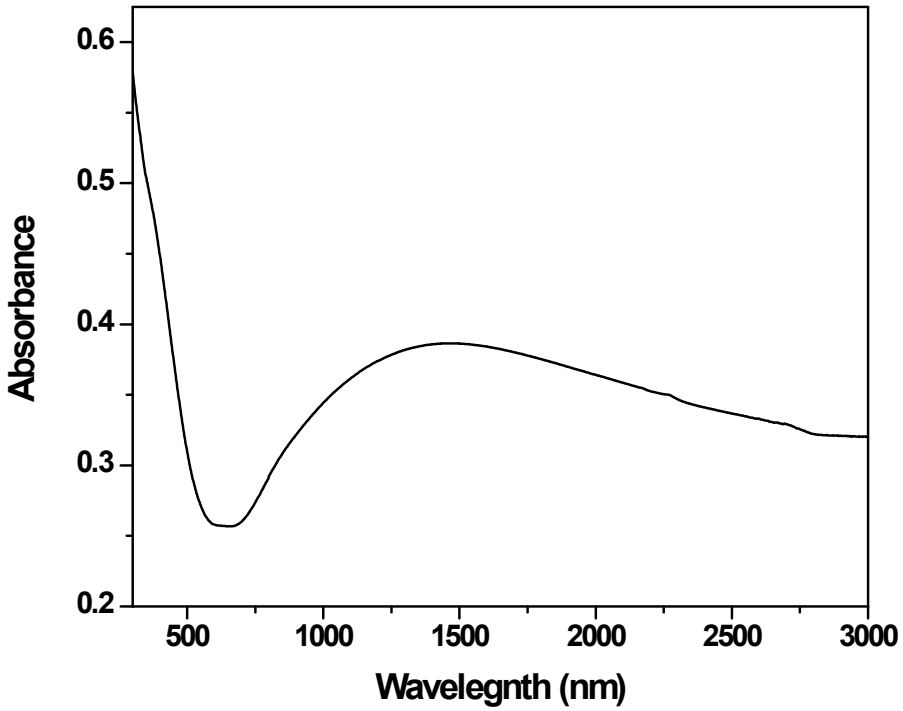


Figure S2. Absorbance spectra of prepared CuS/Pd thin films on glass.

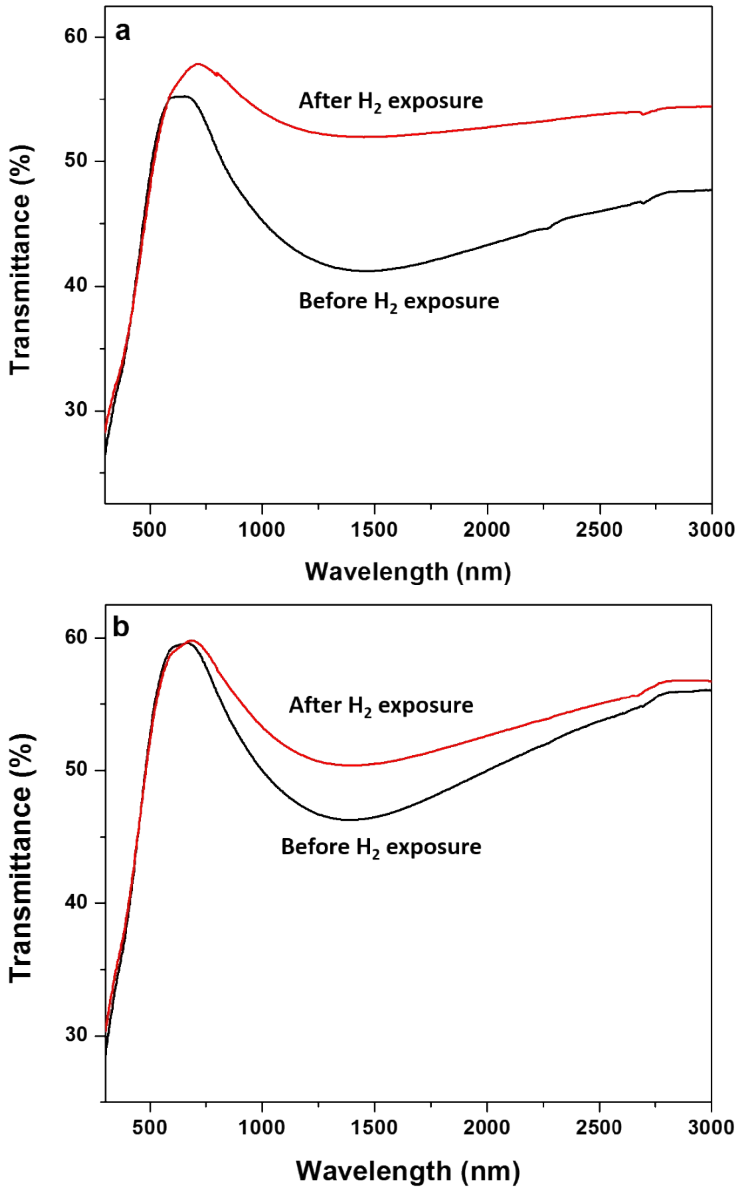


Figure S3. Transmittance spectra of CuS-Pd nanohybrid film on glass substrate before and after passing (a) 100 % and (b) 1% hydrogen gas.

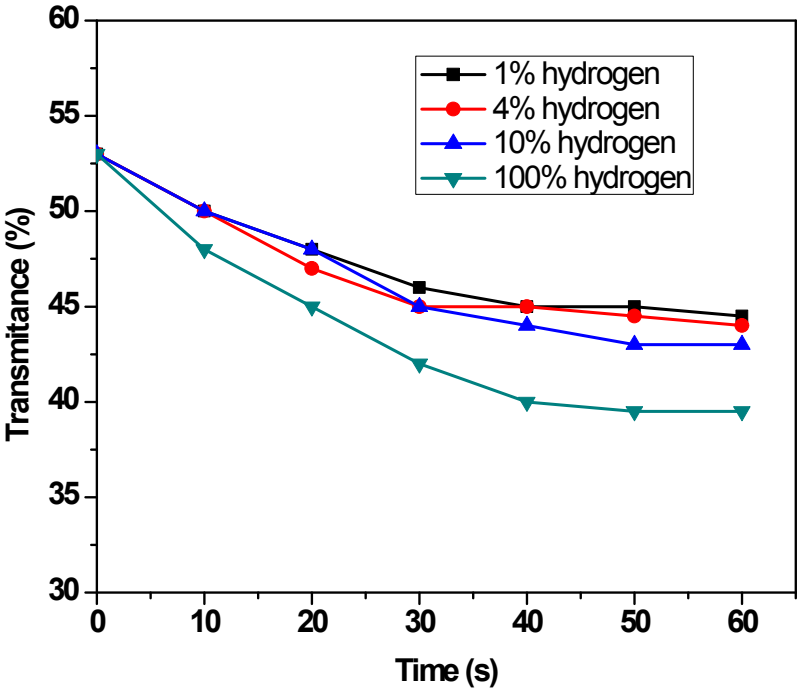


Figure S4. Plot of tranmittance vs response time of CuS-Pd thin films at different hydrogen concentrations at 1475 nm wavelength.

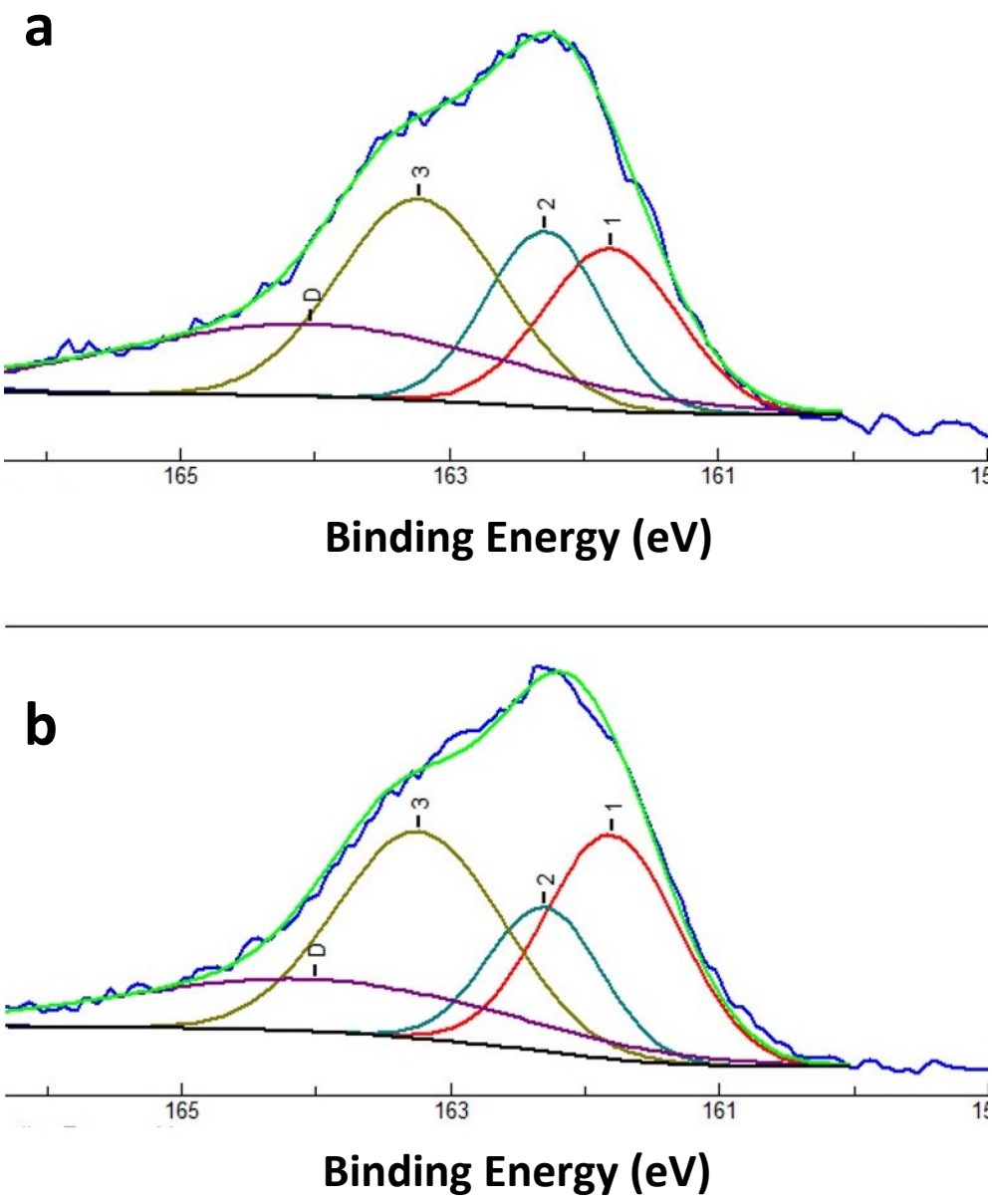


Figure S5. Deconvolution of the S 2p XPS signal (a) before and (b) after hydrogen gas exposure. Peak 1 corresponds to sulfide moiety and peak 2 represents disulfide group.

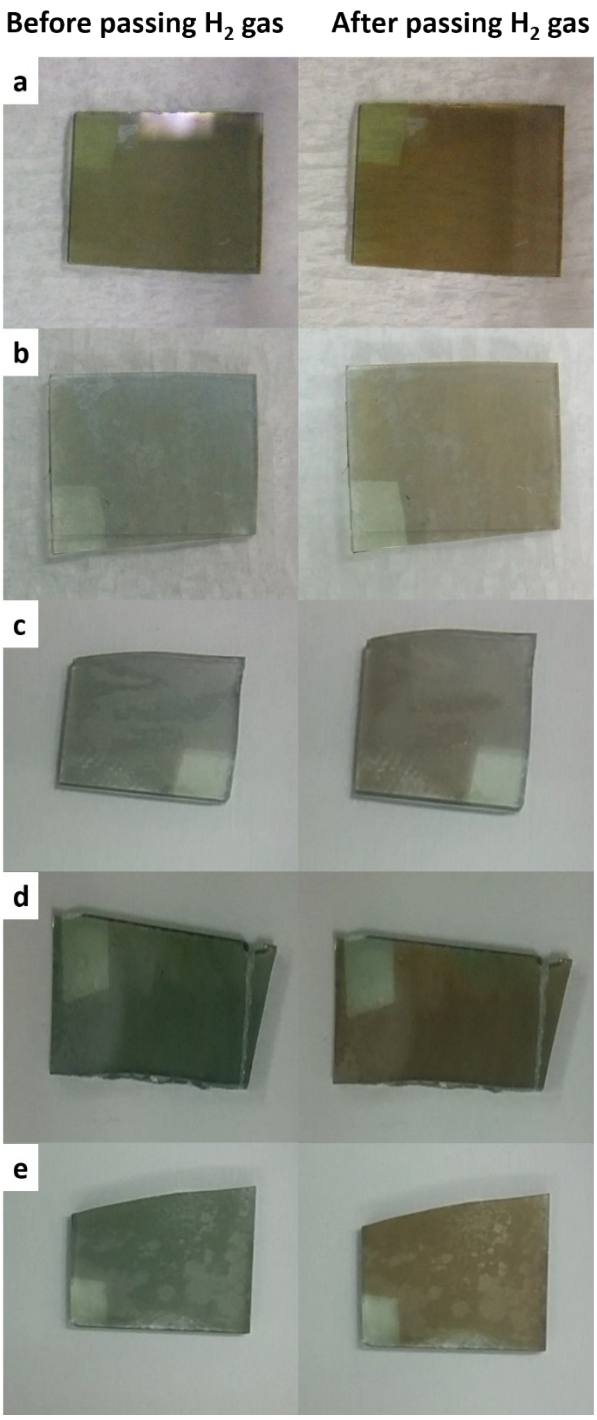
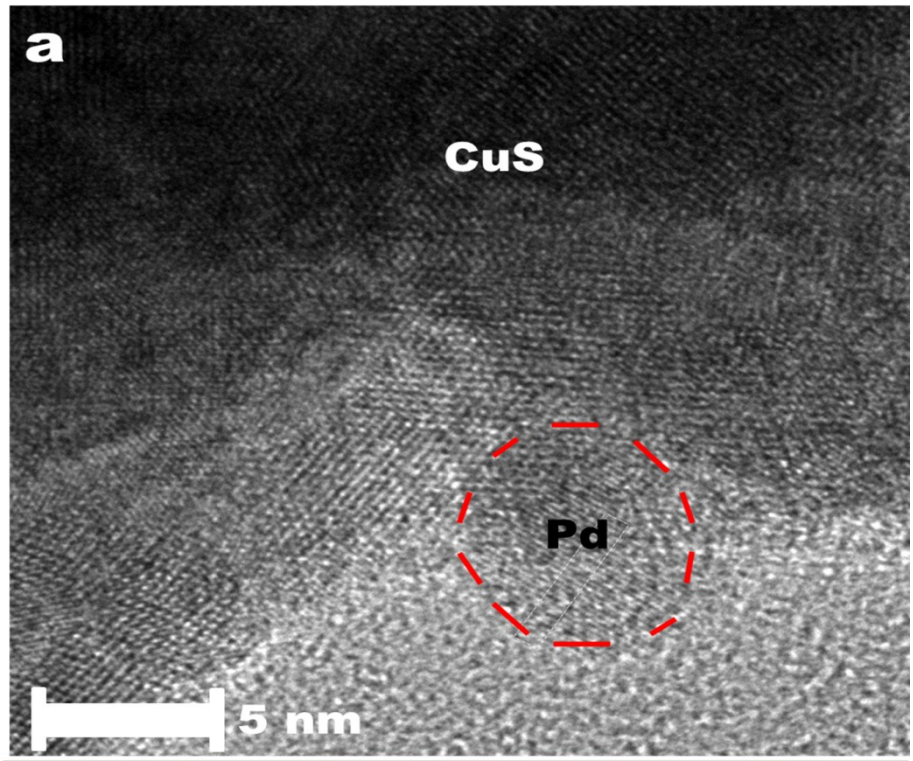
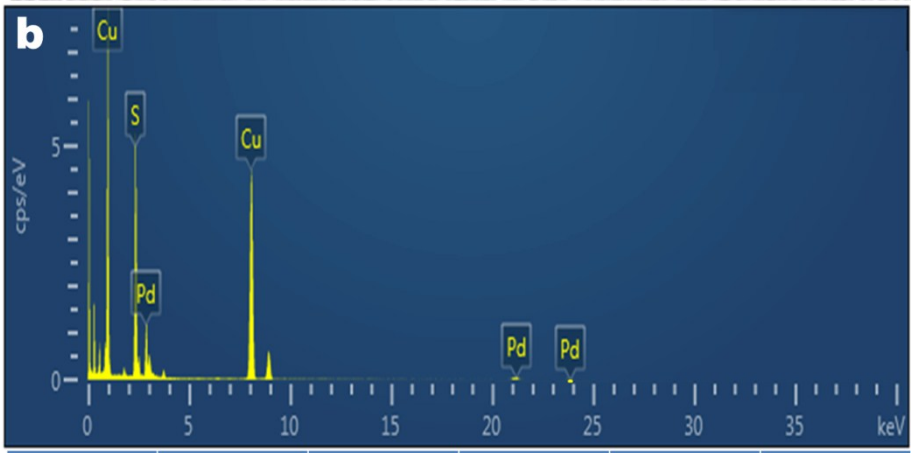


Figure S6. CuS-Pd nanohybrid films on glass tested for chemochromic effect after the fabrication of a) 1, b) 30, c) 60, d) 90 and 120 days.





Element	Line Type	k factor	Absorption Correction	Wt%	Wt% Sigma
S	K series	0.98041	1.00	28.35	0.45
Cu	K series	1.42103	1.00	58.53	0.76
Pd	K series	15.66306	1.00	13.12	1.13
Total:				100.00	

Figure S7. a)HR-TEM of CuS-Pd nanohybrid after hydrogen exposure and its corresponding b) EDS data.

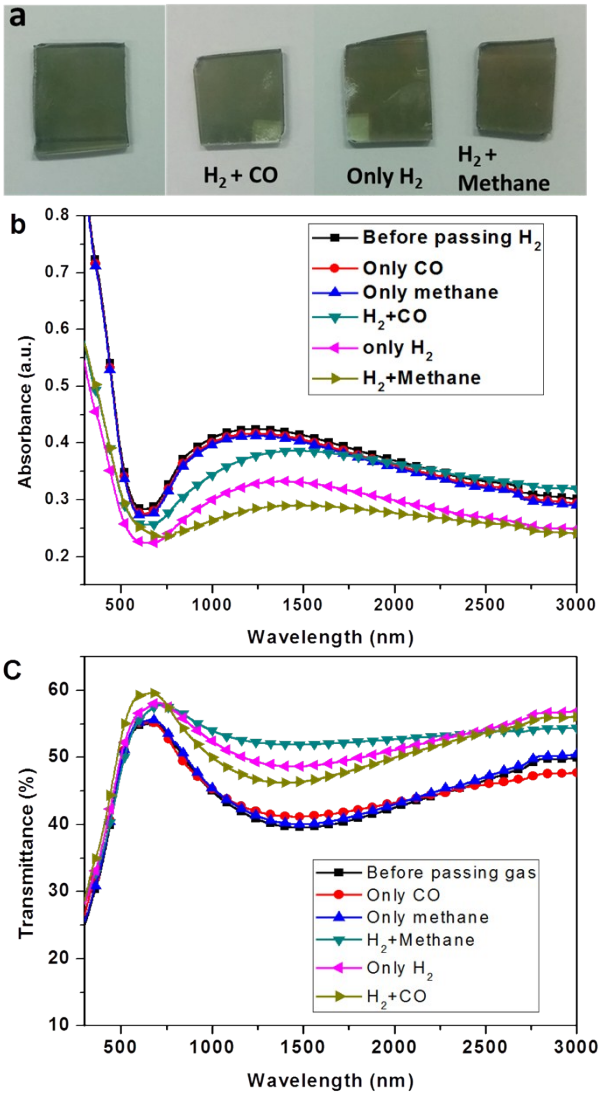


Figure S8. a) photographic images of CuS-Pd thin film hydrogen sensing effects in presence of CO and methane gas. b) and c) representes corresponding absrobance and transmittance properties respectively. In individual gas experiments 100% CO and methane gas is used. In mixtures 50%methane with 50% H_2 and 50%CO with 50% H_2 was used. The pressure inside the chamber was maintained at 456 Torr (from the vacuum background at 1 Torr) and the gas flow rate was 22.8 Torr/min (a total gas feed time to the final pressure was 20 min.