Journal of Materials Chemistry C

Electronic Supplementary Information (ESI)

Stable fluorescent CdS:Cu QDs and their hybridization with carbon polymer dots for white light emission

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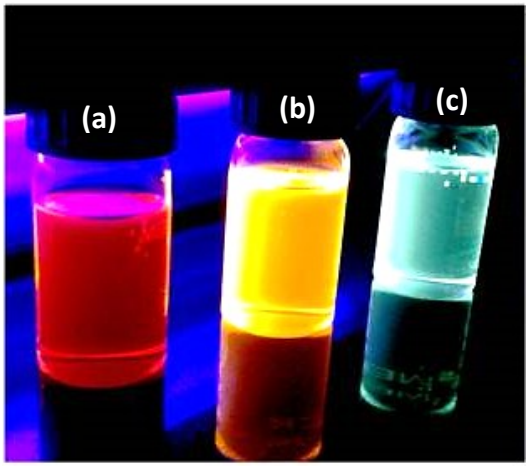

Fig. S1 Digital photos of (a) red emitting CdS:Cu, (b) yellow emitting and (c) cyan emitting CdS NCs dispersion.

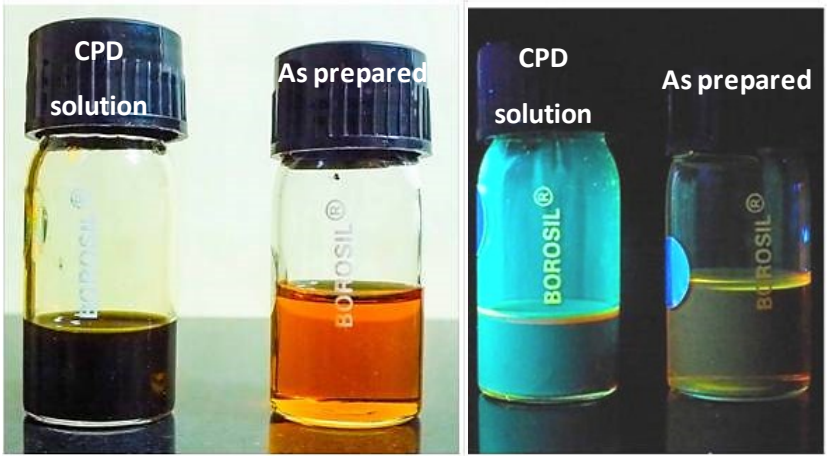

Fig. S2 Digital photos of CPD and as prepared solution of precursors under visible and UV light (λ_{ex} = 365 nm).

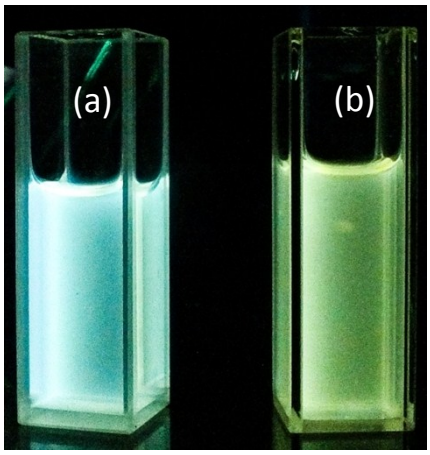

Fig. S3 Digital photos of (a) CdS (cyan emitting)/CPD and (b) CdS (yellow emitting)/CPD hybrid colloidal solutions showing impure white light emissions.

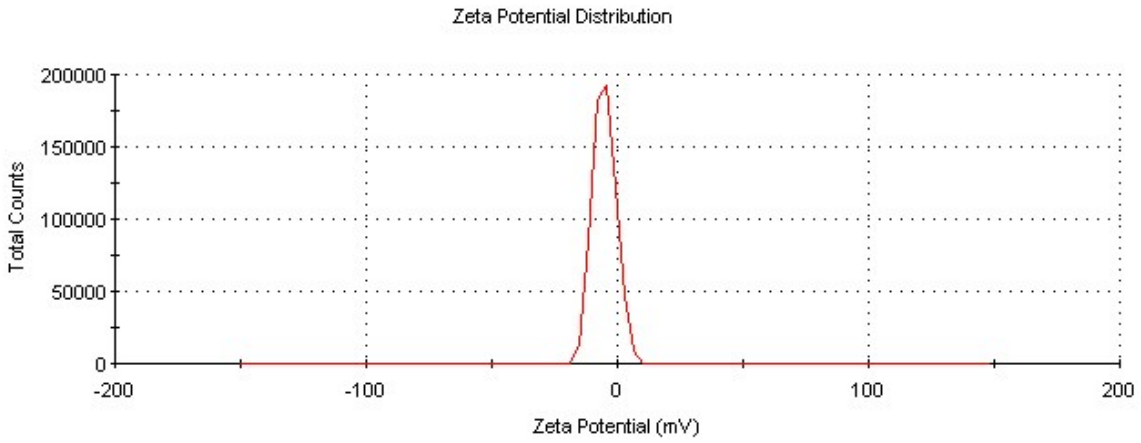

Fig. S4 Zeta potential distribution of CdS:Cu in CH_3CN.

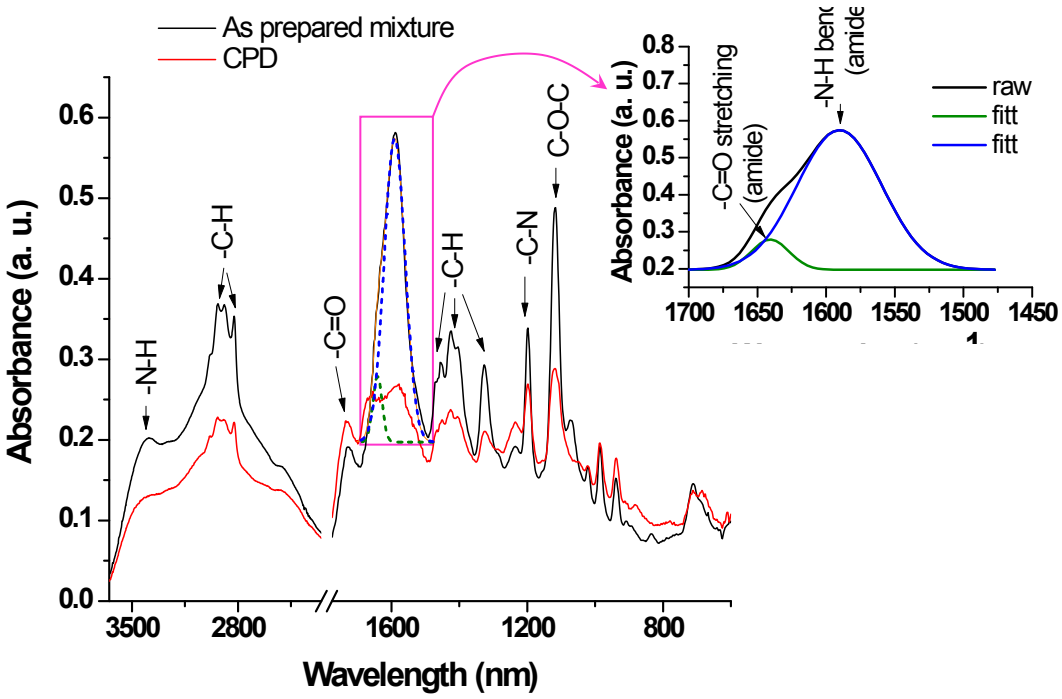

Fig. S5 FTIR spectra of mixture of PEI and methoxy acetic acid in methoxy ethanol solvent before and after heating at 200 ºC. Inset shows the magnified view of deconvoluted peak 1525-1700 cm^{-1}.

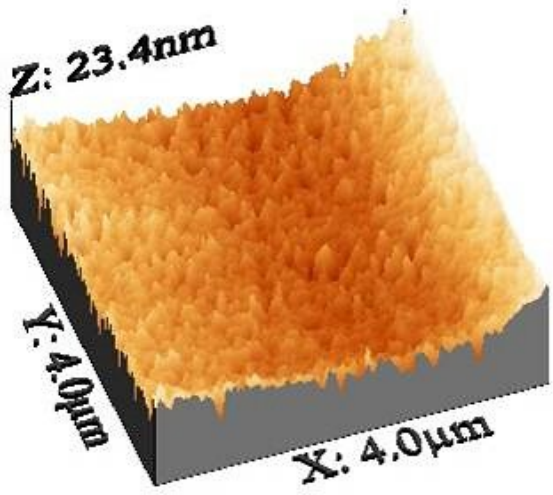

Fig. S6 3D AFM image of bare CdS:Cu film (without ORMOSIL support) deposited on 1.8 x 1.5 cm^2 glass subtrate by spin coating technique.

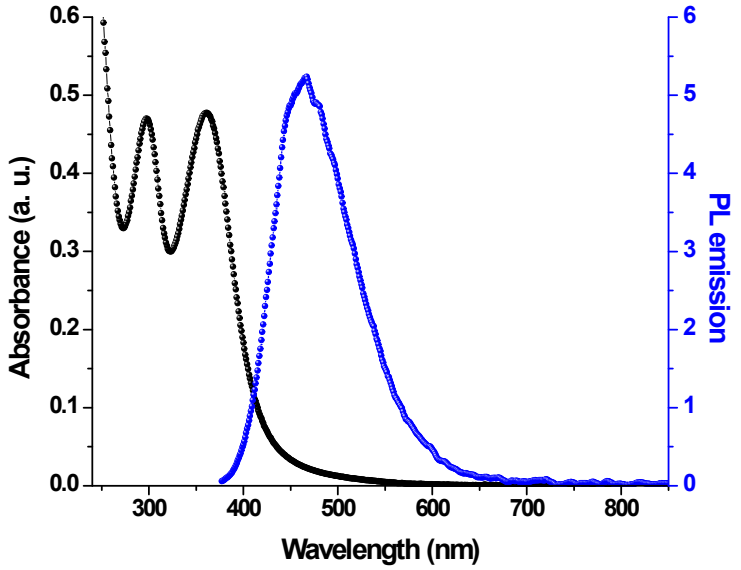

Fig. S7 UV-visible and PL spectra of pure CPD solution.

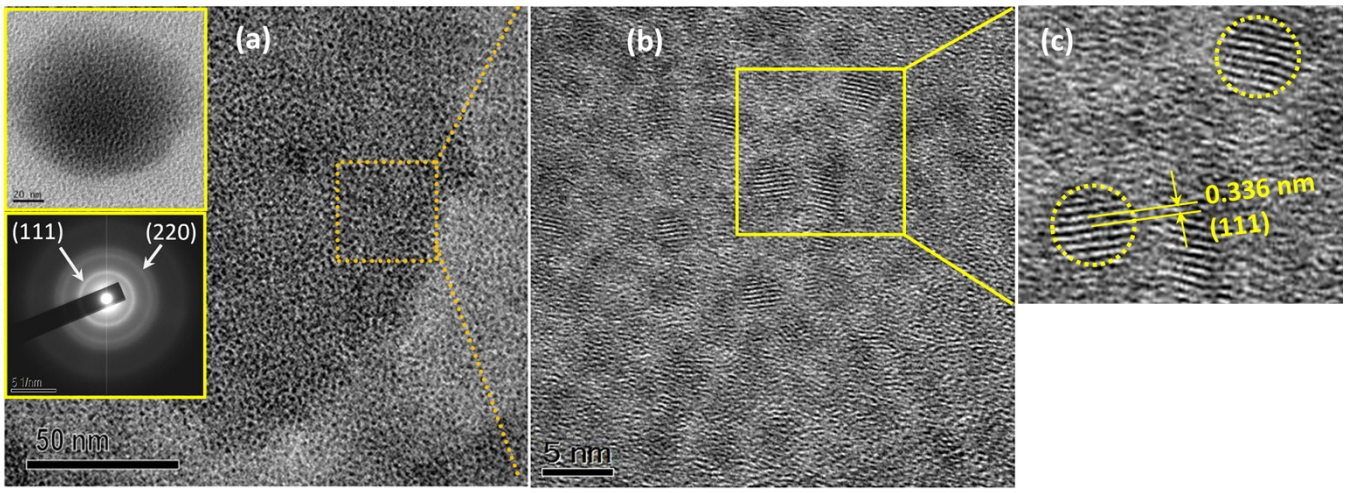

Fig. S8 (a) Low magnification TEM image of CdS:Cu/CPD white light emitting hybrid. Inset shows full view of CdS:Cu/CPD and SAED pattern corresponding to crystalline CdS:Cu. (b, c) HRTEM showing the characteristic crystalline fringes corresponding to the (111) plane of CdS NCs.

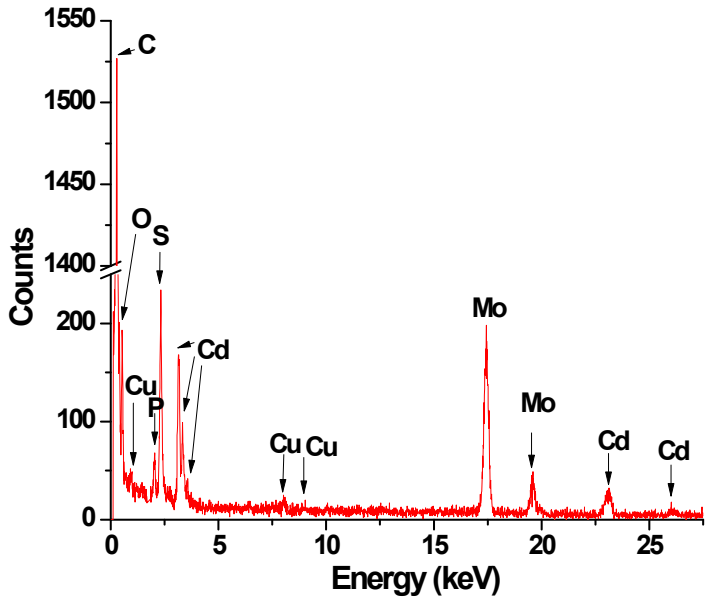

Fig. S9 EDS pattern of CdS:Cu/CPD white light emitting mixture showing the presence of Cd, S, Cu, P and O. Peaks for Mo is coming from the Mo-grid used for TEM analysis.

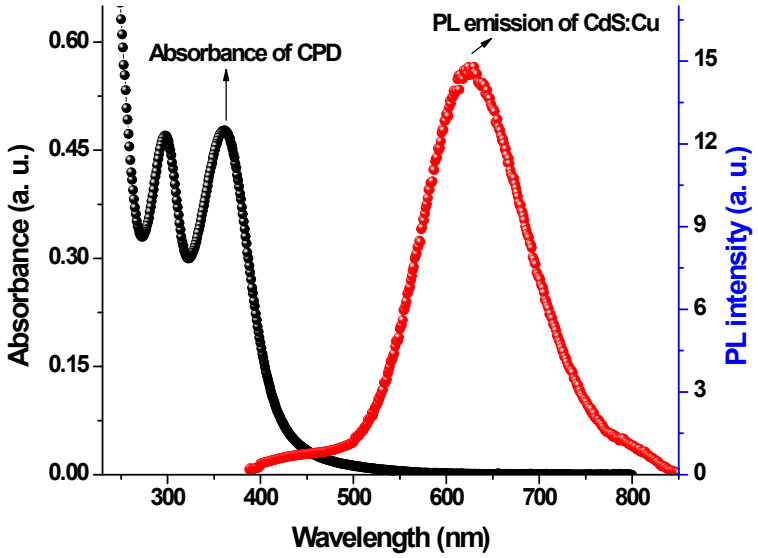

Fig. S10 UV-visible spectrum of CPD (acceptor) and PL of CdS:Cu (donor) solutions showing negligible overlap.

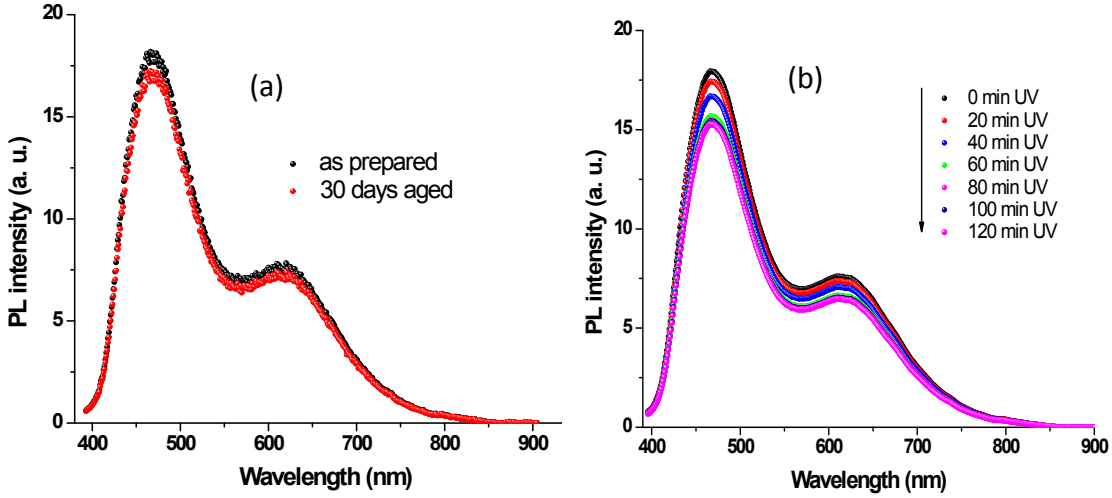

Fig. S11 PL curves showing the stability of white light emitting CdS:Cu/CPD incorporated ORMOSIL film (a) under ambiant condition and (b) UV irradiation.

Table S1 Relative quantum yield (QY) is measured with respect to 0.5 x 10^{-4} M aqueous solution of quinine sulfate using equation S1:

$QY_{sample} = (F_{sample}/F_{ref})(A_{ref}/A_{sample})(n^2_{sample}/n^2_{ref}) * QY_{ref}$ ……(eqn S1)

Where, QY_{sample}, F, A, n and QY_{ref} denote quantum yield of the sample, integrated area under the PL emission curve, absorbance at excitation wavelength, refractive index of the samples and quantum yield of the reference, respectively.

Sample name	Absorbance at 365 nm	Integrated emission area	Refractive index of the medium	Quantum yield (%)
Quinine Sulfate (reference)	0.042	1385.7	(Water)= 1.33	58
CdS:Cu	0.031	168.35	(EtOH)= 1.36	10
CPD	0.05	362.57	(EtOH)= 1.36	13.3
White light emitting solution	0.029	155.47	(EtOH)= 1.36	9.8
White light emitting Film	0.035	152.0	(ORMOSIL) = 1.489	9.5