Electronic Supplementary Material (ESI) for Journal of Materials Chemistry


## Supporting information

# Influence of Confinement Regimes on Magnetic Property of Pristine $SnO_2$ Quantum Dots

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Three dimensional surface topography images of QD-3 and QD-2 are shown in Fig. S1. Samples for AFM investigation were prepared by dropping solution containing the QDs onto a new piece of silicon wafer and drying in air at room temperature. AFM studies revealed that the spherical QDs uniformly disperse on silicon wafer. These images show similar morphology of the quantum dots as shown by TEM study.

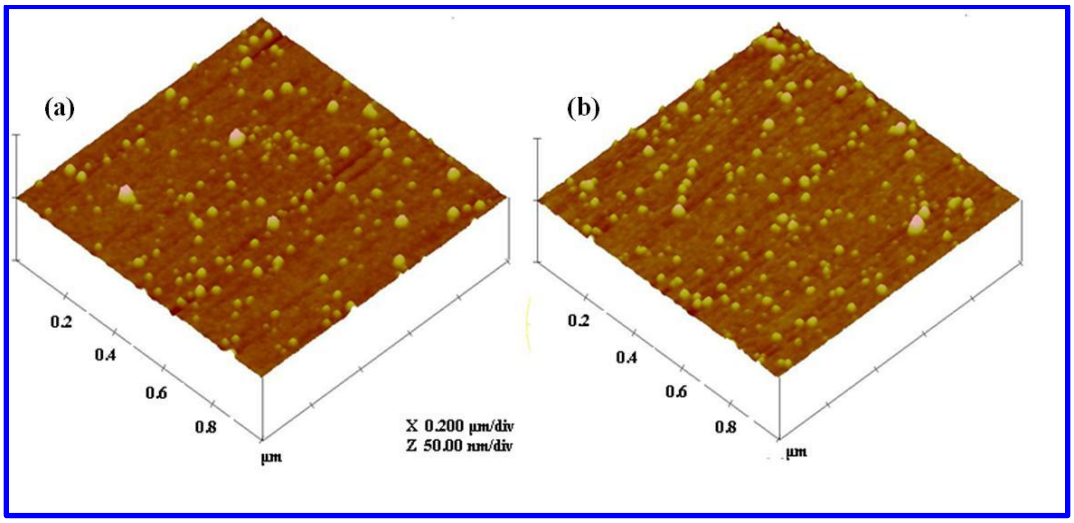


**Fig. S1** AFM images of QD-3 (a) and QD-2 (b).

The Brunauer-Emmett-Teller (BET) surface area measurement was carried out in order to compare the surface area of QD-3 and QD-2. Fig. S2 shows the BET surface area plot of QD-3 (a) and QD-2 (b). The adsorption-desorption isotherms for QD-2 are type IV with a loop indicating the presence of mesopores according to the IUPAC nomenclature. For QD-3 the adsorption-desorption isotherms is nearly overlapped without hysteresis. The mesopores of QD-2

would be ascribed to the interstitial space between the QDs. The QD-2 exhibited a higher surface area of 214 $m^2/g$ while for QD-3 it is 181 $m^2/g$.

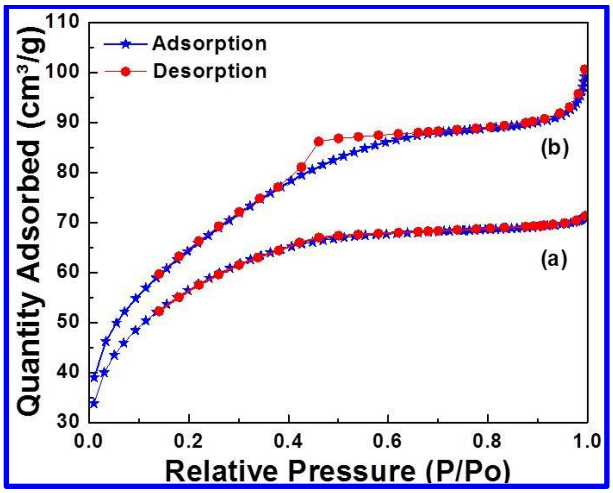


**Fig. S2** BET surface area plot of QD-3 (a) and QD-2 (b).

FT-IR spectra of the QD-3 and QD-2 are shown in fig.S3. The FT-IR spectra of both the samples show essentially identical bands. The bands at 564 and 668 $cm^{-1}$ are assigned to Sn-O stretching vibration of Sn-OH and Sn-O-Sn,[1] whereas the one at 944 $cm^{-1}$ is due to the bending of O-Sn-O.[2] Intensity of this band is significantly larger in case of QD-2, which may possibly attribute to the difference in the amount and type of oxygen vacancies present in these QDs. The bands at 3432 and 1627 $cm^{-1}$ are attributed to the O-H stretching and bending vibration of hydroxyl groups present on the surface, respectively.

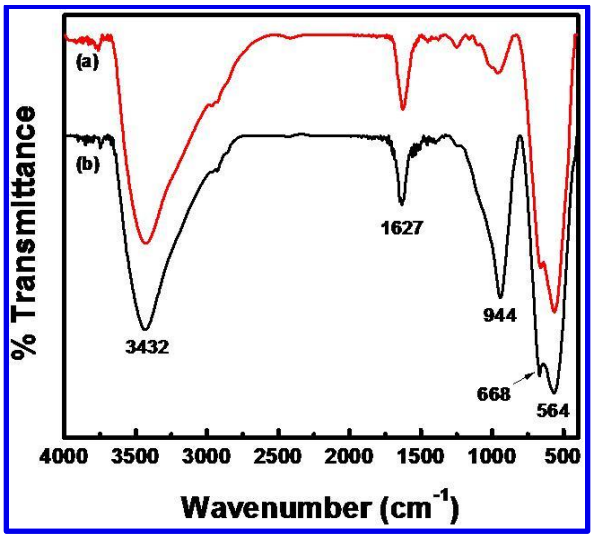


**Fig. S3** FTIR spectra of QD-3 (a) and QD-2 (b).

1 V. Kumar, A. Govind and R. Nagarajan, *Inorg. Chem*., 2011, **50**, 5637.

2 K. Nakamoto, Infrared and Raman Spectra of Inorganic and Coordination Compounds, John Wiley & Sons, New York, 1986, Part 2, p.111.