**Supplementary Information**

**pH dependent luminescence switching of tin disulfide quantum dots**

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**pH dependent absorption and PL spectra of SnS2-QDs**



**Fig. S1:** pH dependent UV-Vis absorption spectra of SnS2-QDs.

Figure S1 shows the absorbance spectra of luminescent SnS2-QDs at different pH conditions. The excitonic behavior of SnS2-QDs at ~ 410 nm shows significant change under pH 1, 3,5,7,9 and 12. The absorption strength of the bands at ~ 410 nm, 311 nm, 265 nm and 235 nm decreases continuously with increases pH values. The detailed mechanism behind this has been already discussed in the main manuscript.



**Fig. S2:** pH dependent emission spectra of SnS2-QDs for an excitation wavelength ~ 410 nm.

Fig. S2 shows the PL spectra of SnS2-QDs with various pH values (pH = 1, 3,5,7,9 and 12). The intense peak observed at ~ 459 nm with excitation wavelength ~ 410 nm. It was observed that PL emission spectrum continuously decreases with increasing pH value. The PL intensity is ~ 16 fold higher at pH ~ 1 than pH ~ 12.

**Irreversibility pH effect on optical property of SnS2 QDs**



**Fig. S3:** Effect of irreversibility on pH value of (a) absorbance spectra (b) PL spectra of Sns2-QDs

**pH dependent FTIR spectra of SnS2 QDs**



**Fig. S4:** pH dependent FTIR spectra of SnS2-QDs.

Fig. S4 shows the FTIR spectra of SnS2-QDs at different pH values. It was observed that the position of different IR peaks at pH ~ 1 is more intense among all other pH values. As we increased pH value ranging from pH ~ 1 to pH ~ 12, different IR peaks decreases.



**Fig. S5:** Variation of decay life time of SnS2-QDs as a function of pH