Supporting Information (SI)

Superior Charge Storage Performance of WS_2 Quantum dots in a Flexible Solid State Supercapacitor

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Equation- 1: Bohr's Equation:

$$R_B = \frac{\hbar^2 E}{e^2}\left(\frac{1}{m_e^*} + \frac{1}{m_h^*}\right)$$

Where $\hbar$ is the reduced Planck's constant, m_e* and m_h* are the effective masses of electrons and holes, respectively, e is the electronic charge, and ε is the relative permittivity of WS_2. The carrier effective masses are taken as m_e* = 0.39m_o and m_h* = 0.40m_o from the literature, where m_o is the electronic rest mass[1]. The dielectric permittivity of WS_2 has been reported to be strongly dependent on the number of layers[2].

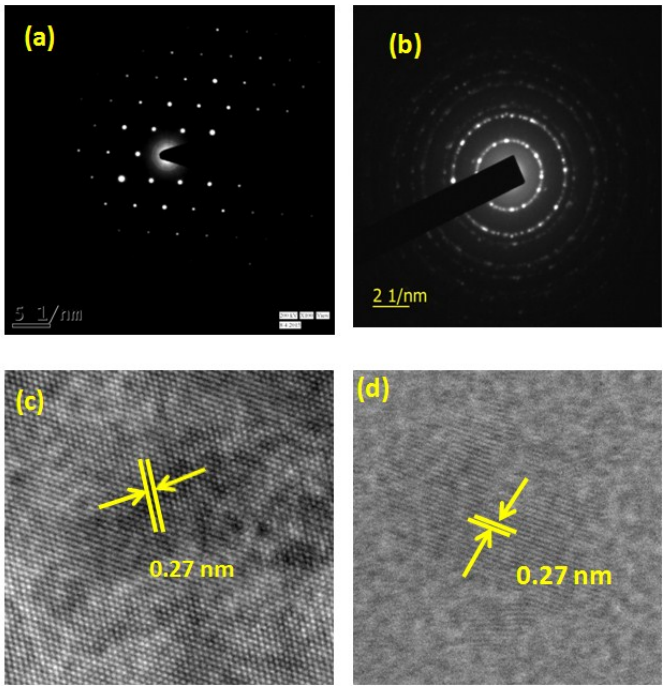

Figure S1: (a Typical selected area electron diffraction pattern of WS_2 (a)NS and (b)QD (b); high resolution TEM image of WS_2 (c)NS and (d)QD.

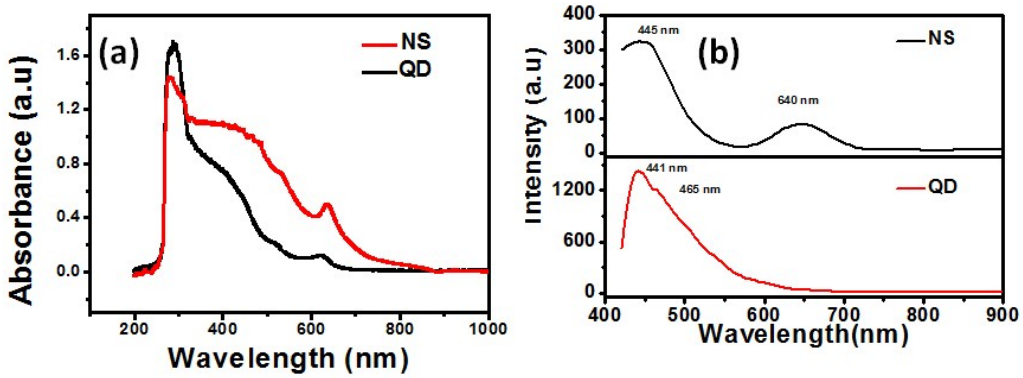

Figure S2: Comparison of (a) UV-Vis spectra and (b) photoluminescence spectra of NS and QD.

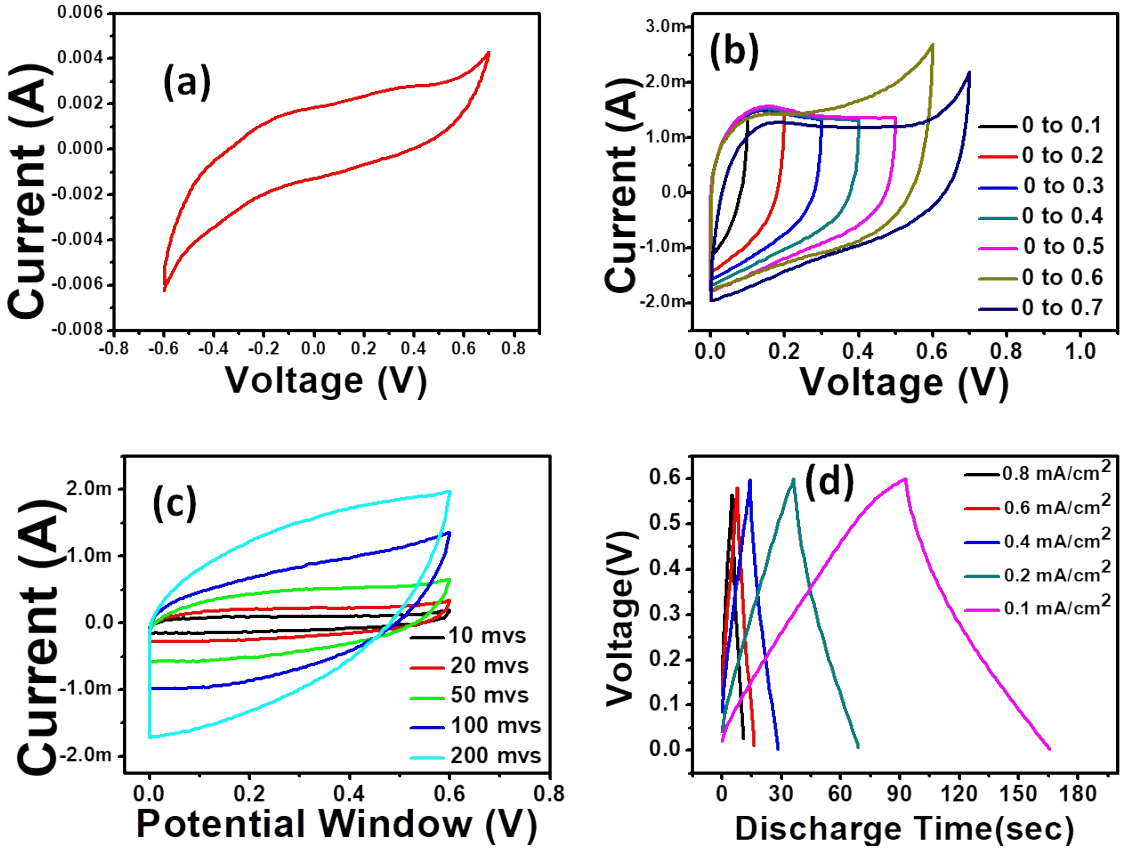

Figure S3: CV curve of the QD-based device in three electrode system using H_3OP_4-PVA at a scan rate of 10 mv/s; (b) cyclic voltammogram of the solid state QD-based device at

different voltage window; (c) cyclic voltammogram and (d) charge discharge of the NS based solid state device under the same condition in which QD-base device is measured.

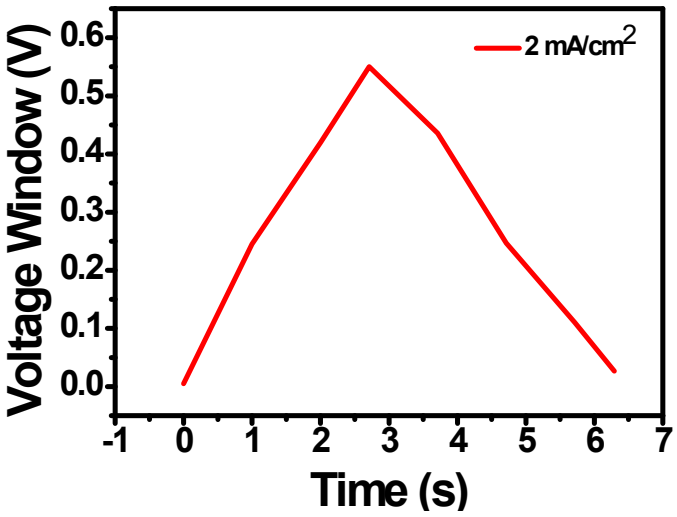

Figure S4: Charge-discharge of WS_2 QD-based device at a current density of 2mA/cm^2.

1. A. Kormányos, V. Zólyomi, N. D. Drummond, and G. Burkard, *Phys. Rev. X*, 2014, **4**, 011034.
2. A. Kumar, P. K. Ahluwalia, *Physica B,* 2012, **407**, 4627–4634.