Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Temperature Assisted Shear Exfoliation of Layered Crystals for the Large Scale Synthesis of Catalytically Active Luminescent Quantum Dots

Shubhadeep Pal[1], Kiran Kumar Tadi [1], P. M. Sudeep [1,2], Sruthi Radhakrishnan [2], and Tharangattu N. Narayanan[1*]

[1]TIFR-Center for Interdisciplinary Sciences (TCIS), Tata Institute of Fundamental Research, 21 Brundavan Colony, Narsingi, Hyderabad, 500075, India.

[2]Department of Materials Science & NanoEngineering, Rice University, Houston, Texas 77005, United States.

(* Corresponding Author: tnn@tifrh.res.in)

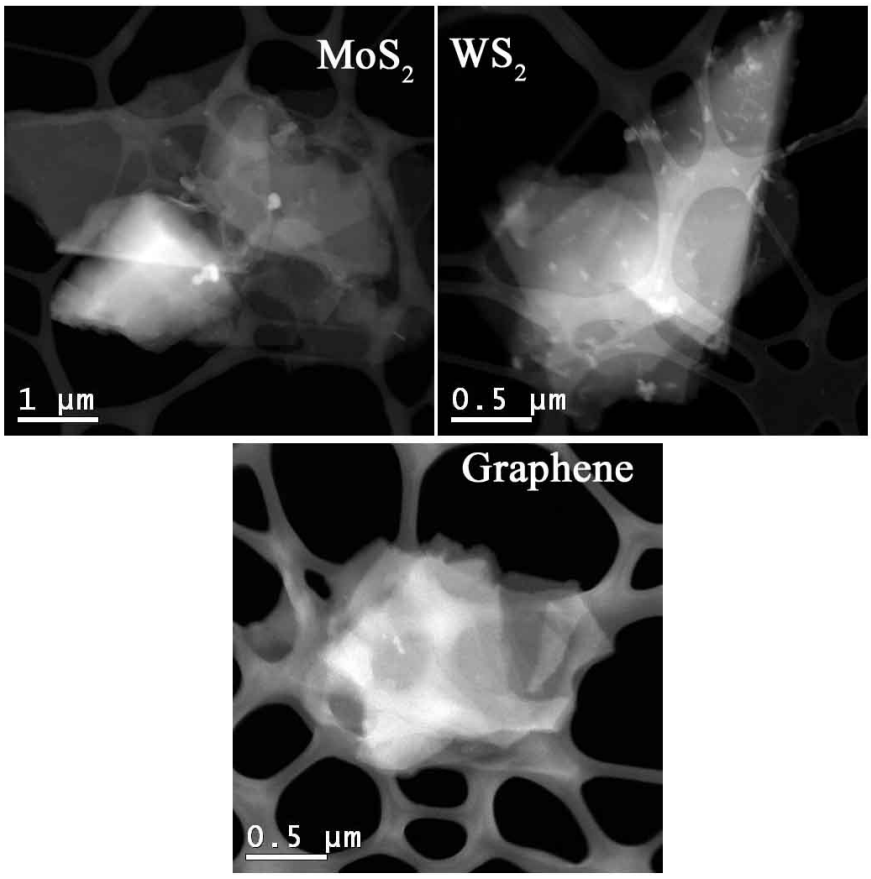

Figure S1: TEM images of sheets (exfoliated at room temperature, shear rate 8000 rpm, 1 hour)

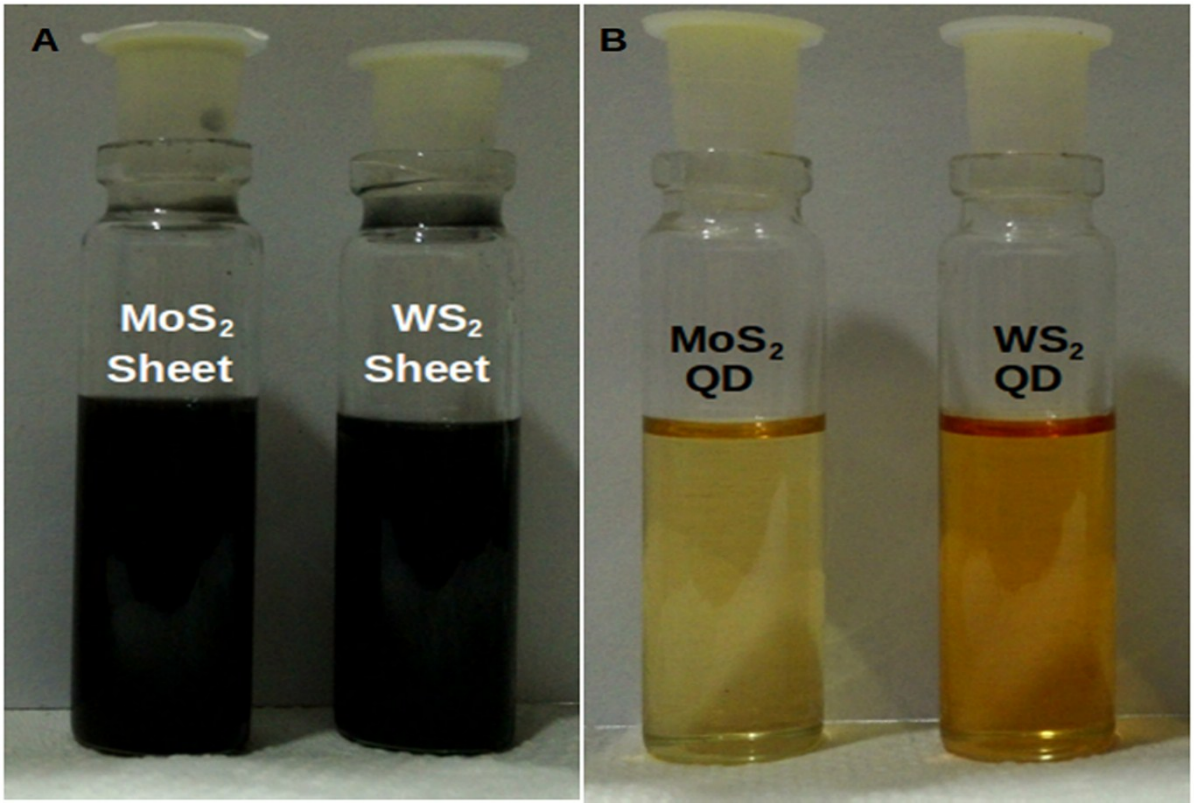

Figure S2: Photographs of exfoliated liquids containing, (A) sheets (B) Qds.

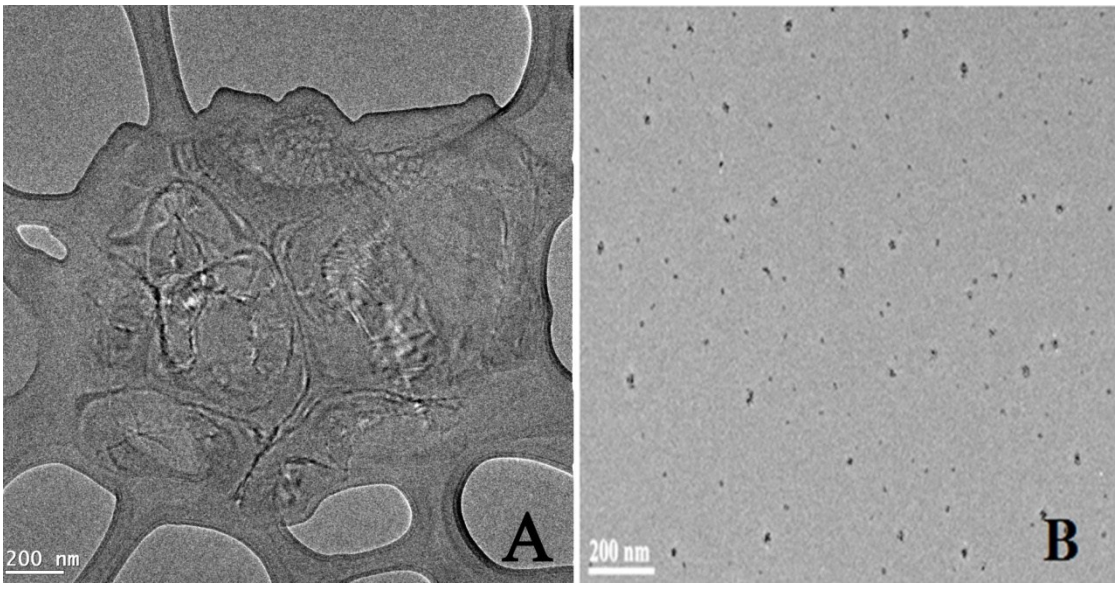

Figure S3: TEM images of, (A) Graphene sheets and (B) QDs.

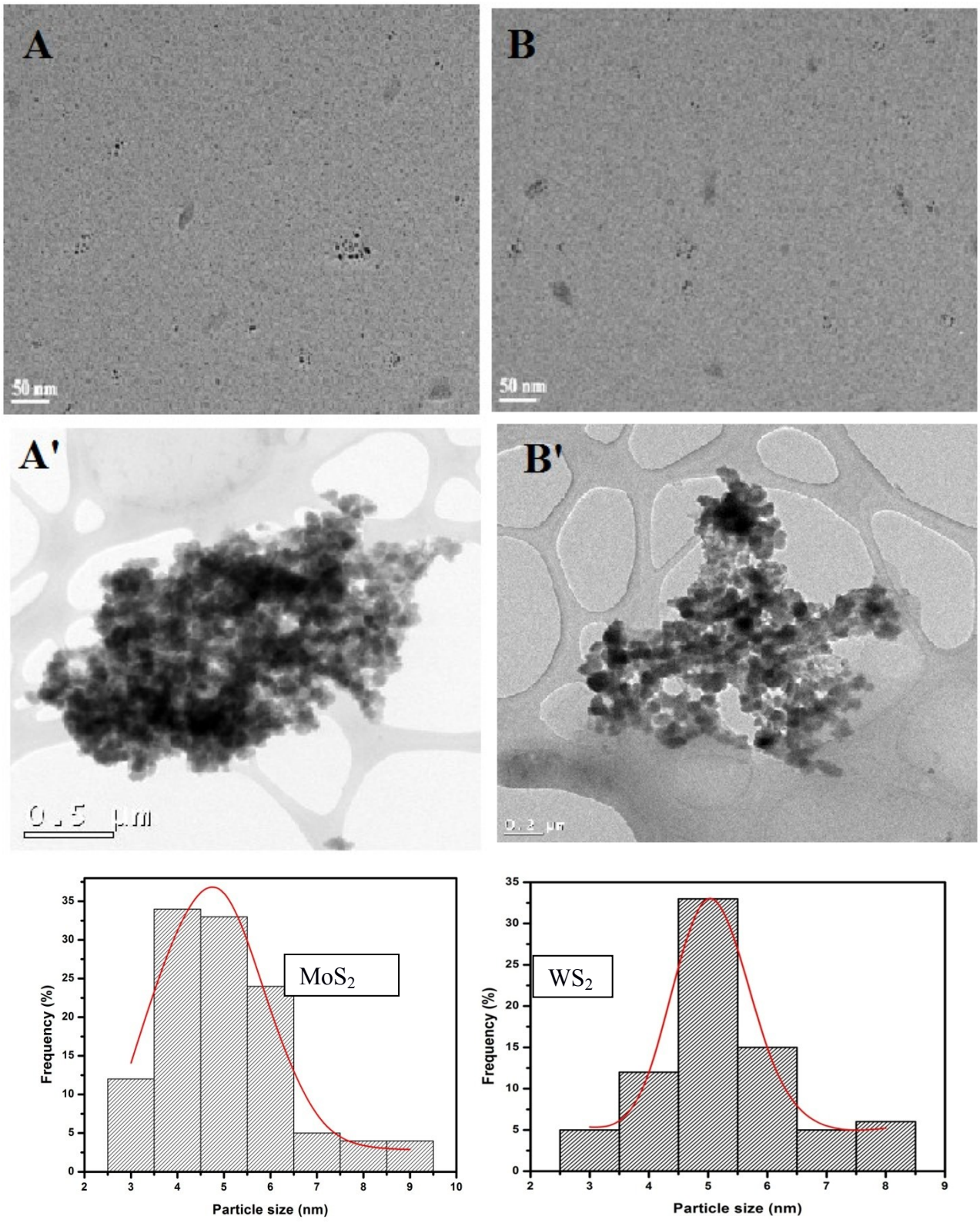

Figure S4: TEM image of MoS_2 QDs (A and A') and WS_2 QDs (B and B') at various magnifications. The particle size histograms of MoS_2 and WS_2 QDs are shown in the bottom.

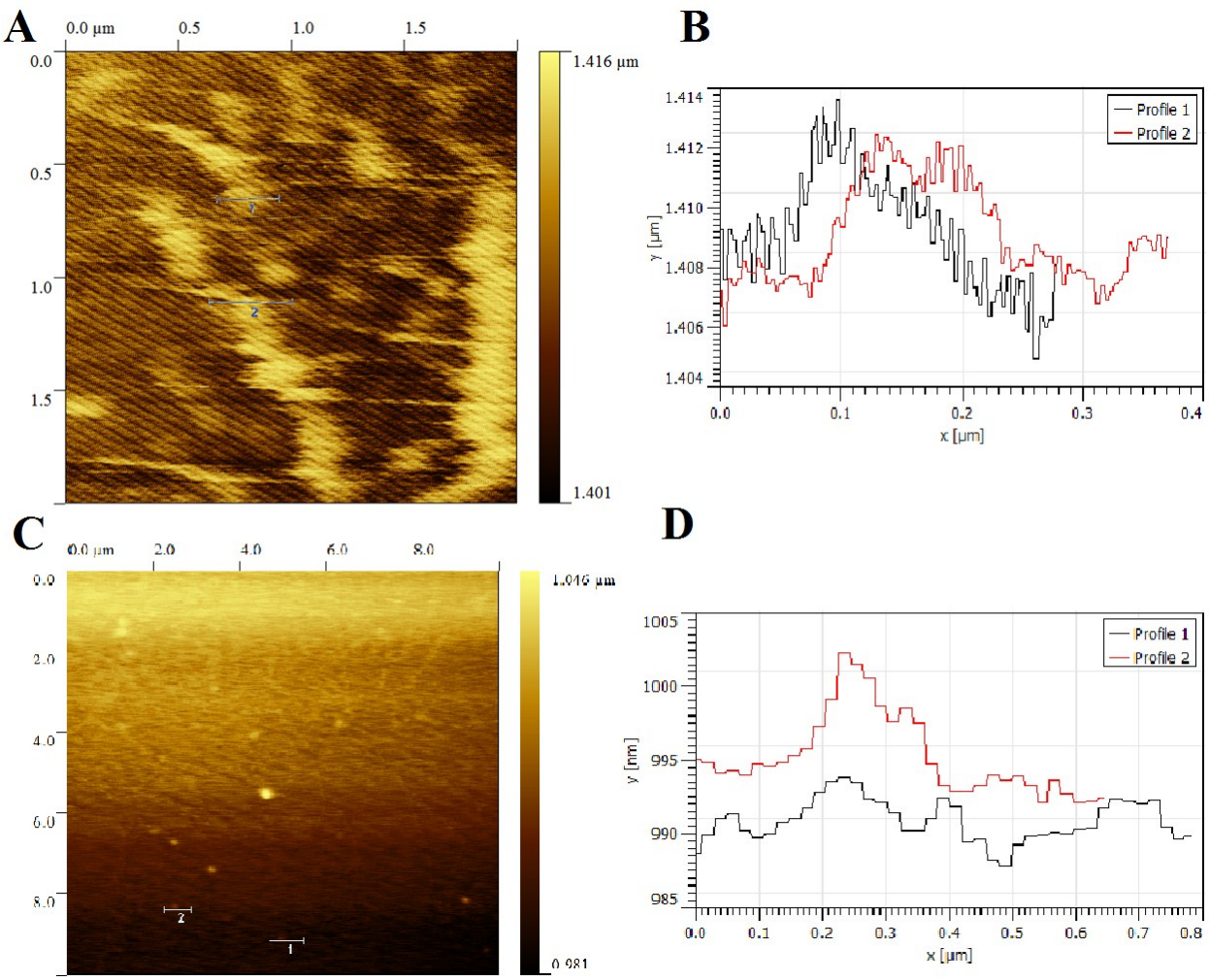

Figure S5. AFM images of images of MoS_2 and WS_2 QDs (A and C) and the corresponding height profiles (B and D).

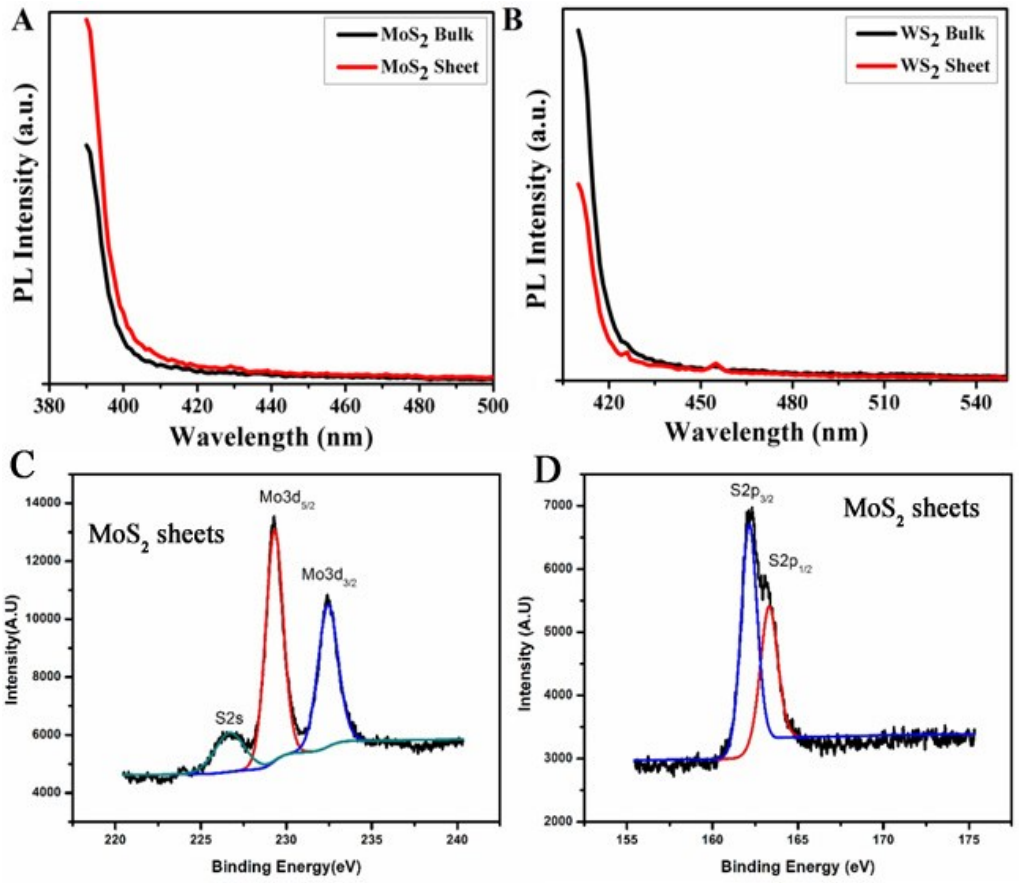

Figure S6: PL spectra of bulk and sheets of MoS_2 (A) and WS_2 with an excitation wavelength of 380 nm. (C) and (D) XPS spectra of MoS_2 sheets.

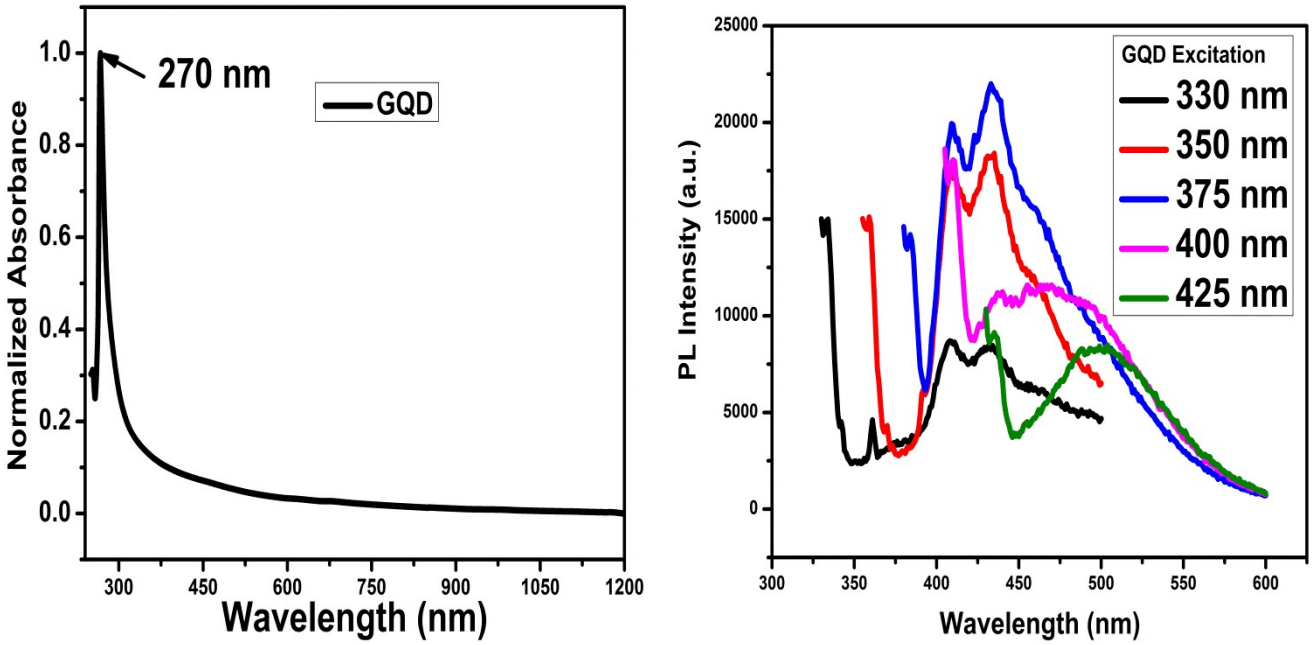

Figure S7: (left) UV-Vis NIR spectrum of Graphene quantum dot (GQD) showing a band edge ~ 375 nm and (right) excitation dependent PL spectra of the same with a maximum intensity corresponding to 375 nm excitation.

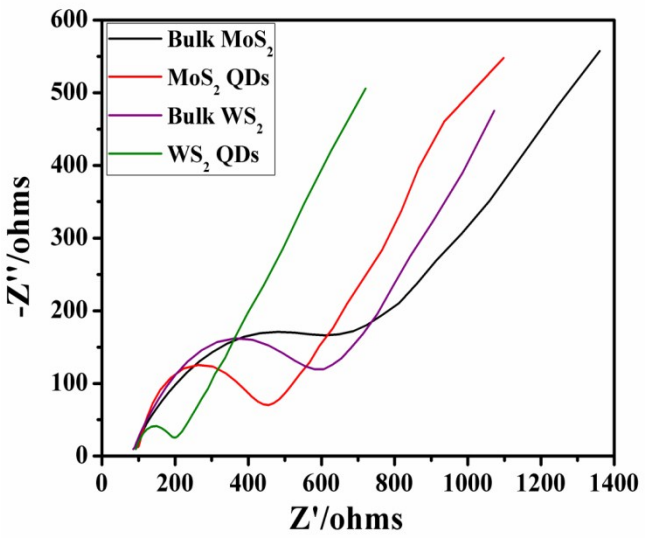

Figure S8: Electrochemical impedance spectra of bulk MoS_2 and WS_2, MoS_2 QDs and WS_2 QDs

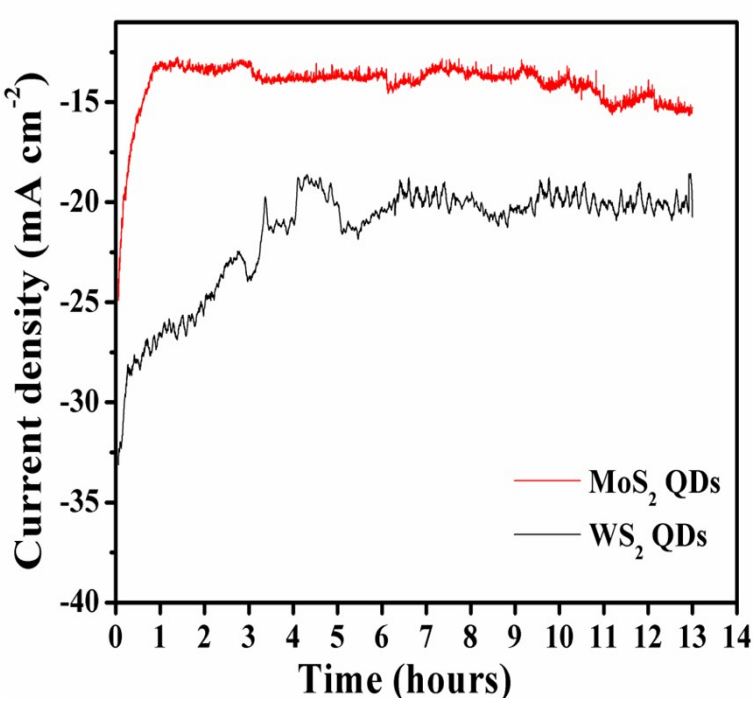

Figure S9: Chronoamaperometric curves showing the stability of MoS_2 (@ 500 mV) and WS_2 QDs (@ 700 mV)