Supporting information

Ultra-small and Monolayered Tungsten Dichalcogenides Quantum Dots with Giant Spin-Valley Coupling and Purple Luminescence

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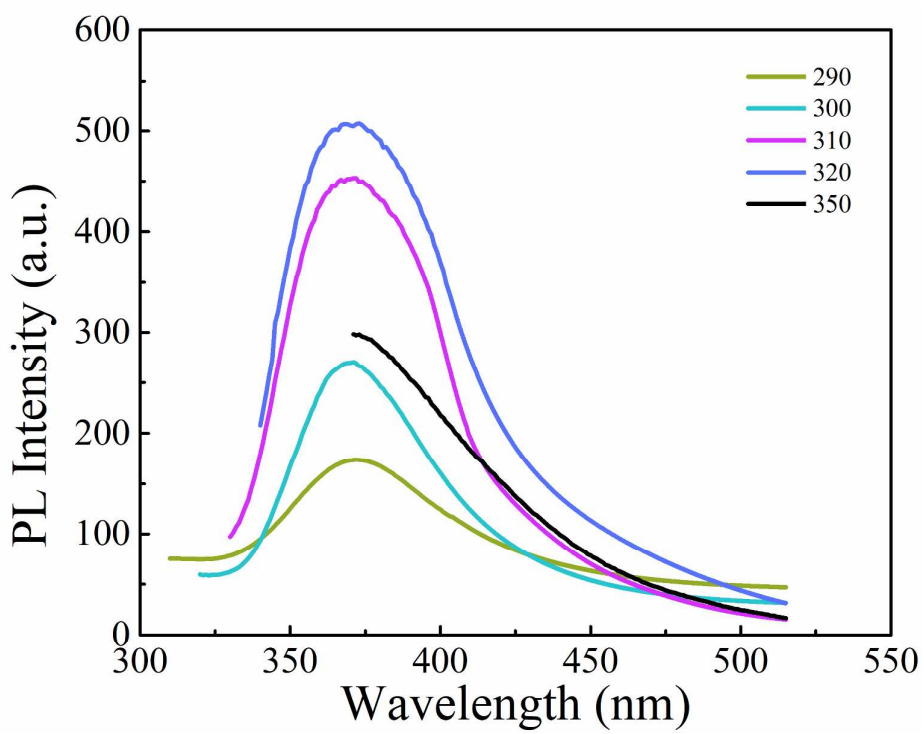

Figure S1. PL spectra of sonicated NMP. It is found that the sonicated NMP shows one peak at about 370 nm, similar to the result reported.[1] It is clear that this PL emission position is much different from the PL emission peak of our ultra-small monolayered quantum dots (emission peak A: 420 nm and B: 342 nm).

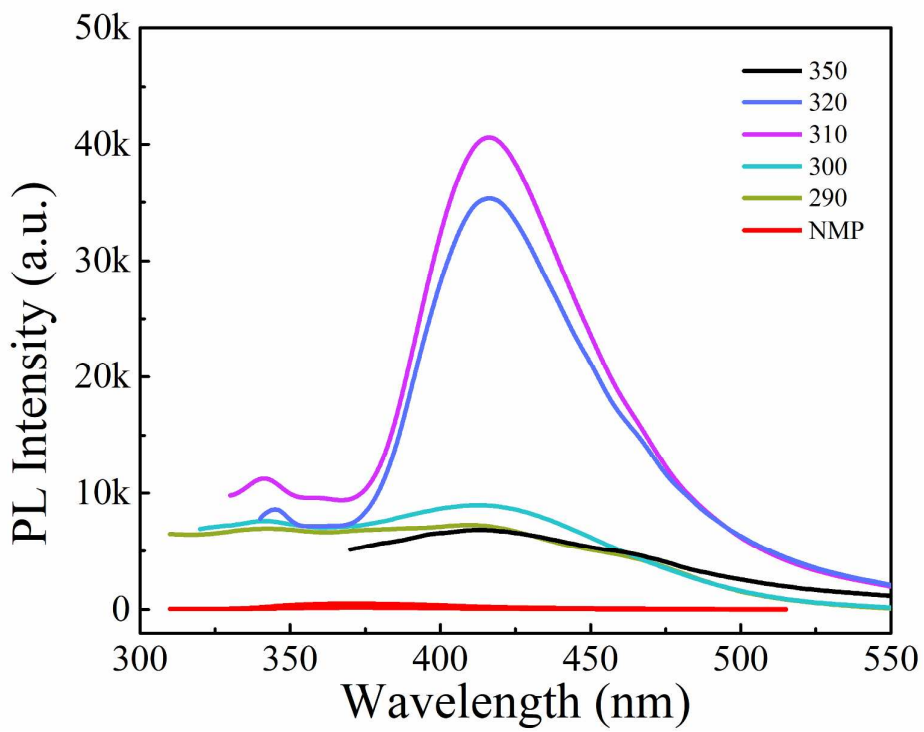

Figure S2. PL spectra of annealed WS_2 QDs and sonicated NMP. According to the result reported,[1] the as-received NMP exhibits only very weak photoluminescence. Based on the PL intensity, Figure S2 shows the PL spectra of sonicated NMP and ultra-small monolayered WS_2 QDs. As shown, the intensity of ultra-small monolayered WS_2 QDs is much stronger than that of the sonicated NMP solvent. The five PL spectral lines of NMP are almost overlapped. Reasonable, the contribution of NMP solvent is negligible, and the purple luminescence should originate from our ultra-small monolayered WS_2 QDs.

Supporting REFERENCES

(1) Ogilvie, S. P.; Large, M. J.; Fratta, G.; Meloni, M.; Canton-Vitoria, R.; Tagmatarchis, N.; Massuyeau, F.; Ewels, C. P.; King, A. A. K.; Dalton, A. B. Considerations for Spectroscopy of Liquid-exfoliated 2D Materials: Emerging Photoluminescence of N-methyl-2-pyrrolidone. *Sci. Rep.* **2017**, *7*, 16706.