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**High Efficient Degradation of Dye Molecules by PDMS Embedded Abundant
Single-layer Tungsten Disulfide and Their Antibacterial Performance**

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ABSTRACT

This work, we achieved the first-ever demonstration in the polydimethylsiloxane embedded with the abundant single-layer tungsten disulfide (WS₂) nanoflowers (PDMS/WS₂ NFs) for the degradation of organic dye (Rhodamine B, RB) in dark environment. The degradation ratio of the PDMS/WS₂ NFs brick reached ~ 99% and achieved ten cycling test where each cycle took 90 min for the decomposition of the dye molecules. The rate constant of the PDMS embedded WS₂ NFs was 0.13 (ppms⁻¹), with the highest degradation rate of ~ 6624 ppm L mole⁻¹ s⁻¹. This is the fastest degradation rate using the PDMS embedded with the abundant single-layer WS₂ NFs. We further demonstrated the antibacterial properties of single and few-layers WS₂ NFs reaches more than 99.99% to against the Escherichia coli (E.

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