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Structural, optical, magnetic and electrochemical properties of hydrothermally synthesized WS_2 nanoflakes

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Abstract

Transition metal dichalcogenides (TMDCs) have emerged as highly intriguing materials due to their unique tunable band gap properties with layer number, finding applications in optoelectronic devices. TMDCs have been considered as potential hydrogen evolution reaction (HER) catalysts. Here we describe the hydrothermal synthesis of WS_2, a promising TMDC material for efficient HER, under various conditions, and its structural, optical and magnetic and electrochemical studies are discussed in detail. The WS_2 nanoflakes have good optical absorption property in region of 400–700 nm and the photoluminescence spectra show the excitation-dependent emission from two peaks corresponding