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Synthesis, characterization and photocatalytic degradation of Rhodamine B dye under Sun light irradiation of Porous Titanosilicate (TS)/Bismuth vanadate (BiVO4) nanocomposite hybrid catalyst

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Photoluminescence

To further confirm the separation mechanism of electron–hole pairs in BVTS1 hybrid nanocomposite as discussed above, the room temperature PL properties of the as-prepared pure m-$BiVO_4$ and BVTS1 hybrid nanocomposite were investigated as shown in Fig. S1. The PL spectra of pure m-$BiVO_4$ and BVTS1 hybrid nanocomposite were obtained under an excitation wavelength of 325 nm. As shown in Fig. S1, an emission at about 546 nm was obviously detected in both pure $BiVO_4$ and m- BVTS1 hybrid nanocomposite. However, the fluorescence intensity of BVTS1 hybrid nanocomposite (red line) was weaker than that of pure $BiVO_4$ (black line), clearly demonstrating that the recombination of photogenerated electron–hole pairs was inhibited greatly in BVTS1 hybrid nanocomposite. This result is good agreement with the analysis by the energy band position of $BiVO_4$ and TS, as discussed above. Thus, the PL spectra offer direct evidence for the efficient separation of photogenerated electron–hole pairs in BVTS1 hybrid nanocomposite, leading to enhanced photocatalytic degradation of RhB, compared to pure $BiVO_4$ and pure TS.

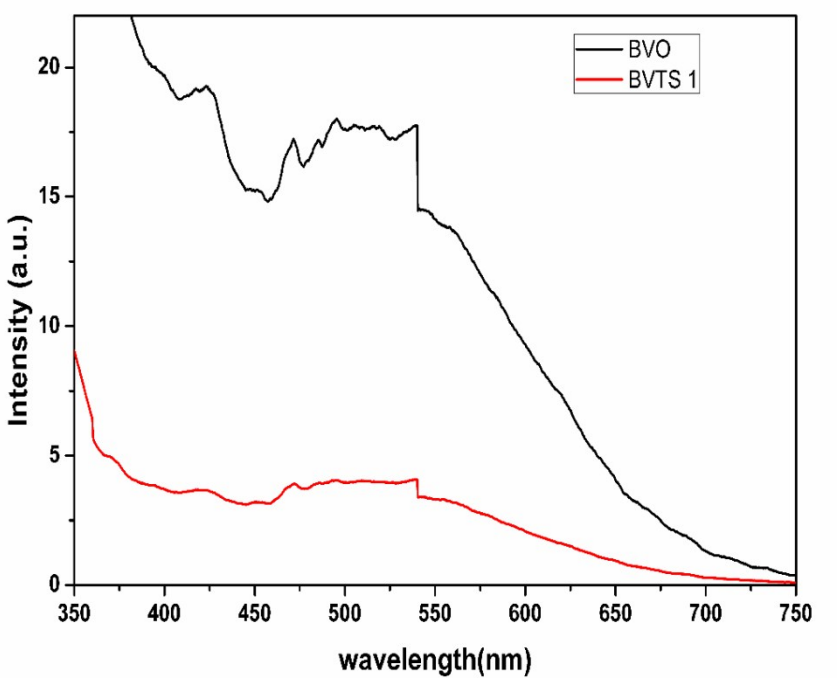
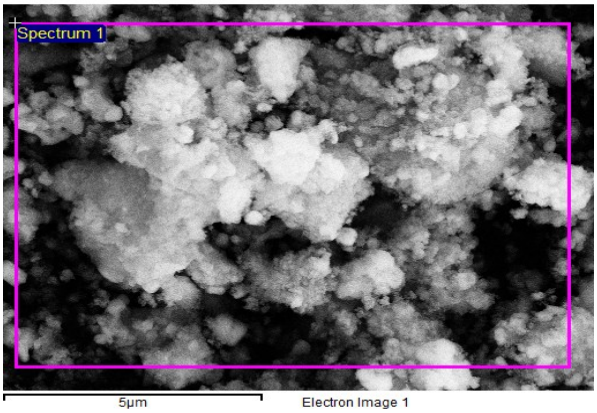
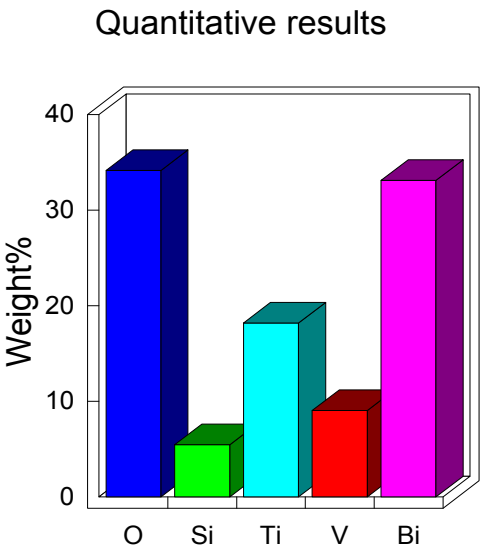
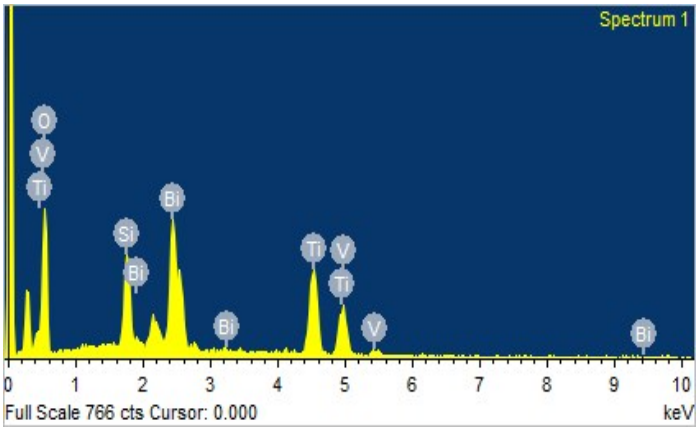


Fig. S1: Photoluminescence of pure $BiVO_4$ (BVO) and BVTS 1 Hybrid nanocomposite.







Element	Weight%	Atomic%
O K	34.17	70.11
Si K	5.45	6.37
Ti K	18.21	12.48
V K	9.06	5.84
Bi M	33.11	5.20
Totals	100.00	

Fig. S2: FESEM EDX of elemental composition BVTS 1 Hybrid nanocomposite