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## Hydrothermal synthesis and characterization of hyperbranched $\text{BiVO}_4$ microstructure and its applications

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Bismuth vanadate ( $\text{BiVO}_4$ ) microstructures were successfully synthesized by a hydrothermal method at 200 °C for 24 h. The phases and morphologies of the products were characterized by X-ray diffraction (XRD), Raman spectroscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM), selected area electron diffraction (SAED) and photoluminescence (PL) spectroscopy.  $\text{BiVO}_4$  microstructures were self-assembled from bismuth nitrate and ammonium vanadate solutions by controlling pH of the precursor solutions without adding surfactant. The XRD results show that the products were pure monoclinic  $\text{BiVO}_4$  phase at the pH 1. At pH 1 and 2, the morphologies of the products were hyperbranched and spherical microstructure, respectively. The PL spectra were determined by an excitation wavelength of 275 nm. They showed the similar peaks at 420 nm (2.95 eV) and 365 nm (3.40 eV) for those of the products synthesized at the pH 1-2. In addition, the anti-bacterial properties of the as-synthesized  $\text{BiVO}_4$  were investigated. The result shows that  $\text{BiVO}_4$  synthesized at the pH 1 can play the role in inhibiting of *S. aureus* ( $3.5 \times 10^{-5}$  CFU) more than *E. coli* (a large number of counts).

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