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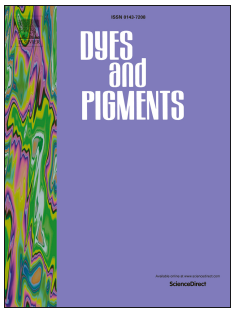

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Thermochromic behaviors of boron–magnesium co-doped $BiVO_4$ powders prepared by a hydrothermal method

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Highlights

- Pure $BiVO_4$ and all the doped samples has been successfully synthesized by hydrothermal method.
- Co-doping occurred structure deformation and lowering band gap energy than single doping in $BiVO_4$.
- Improved the thermochromic behaviors of $BiVO_4$ by using B–Mg co-doping.

Abstract[1]

Pure $BiVO_4$, B-doped $BiVO_4$, Mg-doped $BiVO_4$, and B–Mg co-doped $BiVO_4$ were prepared using a mixed aqueous solution of bismuth nitrate ($Bi(NO_3)_3$) and ammonium vanadate (NH_4VO_3) using a hydrothermal method. The crystal structure and thermochromic behaviors of $BiVO_4$ samples were investigated using X-ray diffraction, UV-Vis spectrophotometry, and in situ X-ray diffraction to compare the effects of the doping elements on the thermochromic behaviors of $BiVO_4$. The results showed that B and Mg ions co-doped into the lattice of $BiVO_4$ led to lattice deformation, ehigher impurity levels, more new band gap states, a narrower band gap, and an improvement in thermochromic behaviors than either ion alone.

[1] Abbreviations: XRD, X-ray diffraction; UV-Vis, ultraviolet-visible; DRS, diffuse reflectance spectra; RIR, reference intensity ratio