

# **Photonic crystal coupled carbon quantum dots(CQDs) decorated porous BiVO<sub>4</sub> hybrid for efficient photocatalysis under a broad spectrum irradiation**

XIUFANG ZHANG,<sup>1</sup> MIYUAN LI<sup>2</sup>

<sup>1</sup> School of Light Industry and Chemical Engineering, Dalian Polytechnic University, Dalian 116034, China, E-mail: zhangxf010807@163.com

A bilayer TiO<sub>2</sub> photonic crystal (PC) coupled carbon quantum dots(CQDs) decorated porous BiVO<sub>4</sub>(TiO<sub>2</sub> PC/CQDs -porous BiVO<sub>4</sub>) was constructed for the enhancement of photocatalytic ability under sun light. CQDs act as the spectrum converter (convert near-infrared light into visible light) and TiO<sub>2</sub> PC layer act as the back reflector to realize enhanced light absorption (broad spectrum and elevated absorbance intensity) by porous BiVO<sub>4</sub>. The photocatalytic activity was evaluated by the degradation of PBA and compared with porous BiVO<sub>4</sub> and CQDs -porous BiVO<sub>4</sub>. The photocatalytic ability of porous BiVO<sub>4</sub> was enhanced by CQDs decoration and bilayer film construction with TiO<sub>2</sub> PC. This increase could be attributed to the enhanced light absorbance ability produced by reflection from the TiO<sub>2</sub> PC layer and the efficient up-conversion effect by CQDs.