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1. Highlights in 2007

1. Novel visible light active material \(\text{(Ag}_{0.75}\text{Sr}_{0.25})(\text{Nb}_{0.75}\text{Ti}_{0.25})\text{O}_3\)

A “green” chemistry process for environmental purification is realized on a novel visible-light-active photocatalyst \((\text{Ag}_{0.75}\text{Sr}_{0.25})(\text{Nb}_{0.75}\text{Ti}_{0.25})\text{O}_3\), developed by tuning band structure of \(\text{AgNbO}_3\)-\(\text{SrTiO}_3\) solid solution. This mixed valent solid-solution perovskite possesses a strong oxidative potential for efficient photocatalytic decomposition of acetaldehyde (CH\(_3\)CHO) – a common indoor air pollutant – at ambient temperature. The enhanced photocatalytic activity of \((\text{Ag}_{0.75}\text{Sr}_{0.25})(\text{Nb}_{0.75}\text{Ti}_{0.25})\text{O}_3\) is attributed to the modulated band structure constructed by a hybrid conduction band of the empty (Ti 3d + Nb 4d) orbitals and a hybrid valence band of the occupied (O 2p + Ag 4d) orbitals. The new photocatalyst is expected to find practical applications for indoor air purification by further modification of surface nano-structure (\textit{J. Am. Chem. Soc.} \textbf{130}, 2008).

2. Novel 3D hierarchical hollow WO\(_3\) shells and their photocatalytic properties

3-D hierarchical WO\(_3\) hollow shells, including hollow dendrites, spheres and dumbbells, self-organized from tiny WO\(_3\) nanoplatelets, were firstly synthesized by a simple soft chemical route. Distinguished visible-light-driven photocatalytic properties for organic pollutant decomposition were observed, attributed to the larger surface areas, higher light transmission, and much more active sites of these hierarchical hollow shells (\textit{Adv. Funct. Mater.}, 2008).

2. Articles (original article, comment/book)

Original Paper:


2. Defa Wang, Tetsuya Kako, Jinhua Ye, “Efficient decomposition of acetaldehyde over a perovskite-type solid solution photocatalyst \((\text{Ag}_{0.75}\text{Sr}_{0.25})(\text{Nb}_{0.75}\text{Ti}_{0.25})\text{O}_3\) under visible light irradiation”, \textit{J. Am. Chem. Soc.}, \textbf{130}, pp. 2724-2725, 2008.


5. Xiukai Li, Shuxin Ouyang, Naoki Kikugawa, Jinhua Ye, “Novel Ag\(_2\text{ZnGeO}_4\) Photocatalyst for Dye Degradation under Visible Light Irradiation”, \textit{Applied Catalysis A:}}


Defa Wang, Jinhua Ye, Hideaki Kitazawa, and Takashi Kimura, “Photophysical and photocatalytic properties of three isostructural oxide semiconductors In$_6$NiTi$_6$O$_{22}$, In$_3$CrTi$_2$O$_{10}$ and In$_{12}$NiCr$_2$Ti$_{10}$O$_{42}$ with different 3d transition metals”, J. Phys. Chem. C, **111**, pp.12848-12854, 2007.


Yaoming Wang, Tao Yu, Xinyi Chen, Haitao Zhang, Ouyang Shuxin, Zhaosheng Li, Jinhua


3. **Presentation in international/domestic conferences (Invited)**


4. **Others**

none