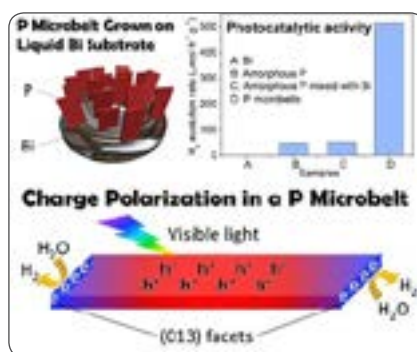


Highly charge polarized elemental phosphorus microbelt photocatalyst growing on liquid bismuth substrate

Yang Liu, Zhuofeng Hu and Jimmy C. Yu
The Chinese University of Hong Kong, China

Charge polarization is an interesting phenomenon. We have observed this effect in crystalline red phosphorus (P). A relatively large-scale (up to $100 \times 10 \times 0.3 \mu\text{m}^3$) single crystal red P microbelts were prepared on liquid bismuth (Bi) substrate via a thermal vaporization method. Under visible light illumination, the P microbelts become highly charge polarized. Electrons accumulate on the two ends which become negatively charged, while the middle of the microbelts becomes positive. Water can be reduced to hydrogen on the two ends with higher electrons density. Such polarization can suppress the charge recombination and thus enhances charge transfer efficiency. Compared with amorphous P where charge carriers are randomly distributed, the photocatalytic efficiency of P microbelts exhibits a 10 times enhancement. The polarization property of P microbelts is confirmed by facet-selective photo-reduction of platinum (Pt) and theoretical calculations.

**Recent Publications**

1. Y. Q. Chen, C. Q. Yang, T. Li, M. Zhang, Y. Liu, M. A. Gauthier, Y. B. Zhao and C. L. Wu* (2015) The Interplay of Disulfide Bonds, α -Helicity, and Hydrophobic Interactions Leads to Ultrahigh Proteolytic Stability of Peptides. 16 (8) 2347–2355.

Biography

Yang Liu received her B.Sc. Degree from Xiamen University in 2019. She is currently pursuing her PhD degree in the Department of Chemistry, The Chinese University of Hong Kong. Her research interests primarily focus on photocatalytic hydrogen evolution, removal of organic pollutants and nitrogen fixation over phosphorus-based photocatalysts.

liuyang@link.cuhk.edu.hk

Notes: