Partially single-crystalline Ta_3N_5 nanomeshes for enhanced photocatalytic hydrogen evolution

Mu Xiao(^), Bin Luo, Supphasin Thaweesak (^), Miaoqiang Lyu (^), Lianzhou Wang(*)

Presentation Preference: poster

Career Level: student

Aligned with Science Focus: Nanomaterials for clean energy application

Abstract.

Novel single-crystalline Ta_3N_5 nanomeshes with a thickness around 2 nm were developed by a graphene-templated bottom-up strategy. Due to the two dimensional (2D) nanomesh morphology and single-crystalline structure, the unique architecture possesses a high specific surface area of 284.6 $m^2 g^{-1}$, improved electron transport ability, as well as increased life time of photogenerated charge carriers. As a consequence, the Ta_3N_5 nanomeshes modified with Pt nanoparticles yields a stable hydrogen evolution rate of 11.6 µmol h^{-1} under simulated sunlight (AM 1.5G, 100 mW/cm^2), which is remarkably superior-by factor of 10-to bulk Ta_3N_5.

Biographical Statement of speaker:

Ms. Mu Xiao received Bachelor's degree from Huazhong University of Science and Technology, and Master's degree from Zhejiang University in China. Now she is a PhD student at the Australian Institute for Bioengineering and Nanotechnology (AIBN), University of Queensland, under the supervision of Prof. Lianzhou Wang. http://www.nanomac.uq.edu.au/mu-xiao