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Self-organized synthesis of metal oxide semiconductor nanowire photocatalyst

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Semiconductor nanowire where semiconducting characteristics as a bulk is confined to the magnitude of around 100 nm in two dimensions has merited special attention in terms of photocatalytic application. We report here self-organized methods that allow for large-scale synthesis of robust metal oxide nanowires and their performance as the heterogeneous photocatalysts. There will be a focus especially on a system of self-assembly between crystals. Specifically, a very slow supply of Mo^{6+} to the solution medium containing Ag^{+} by diffusion triggers particle growth through an oriented aggregation mechanism, which requires end-to-end and/or side-by-side structural accord between crystals, to allow for the first ever synthesis of monoclinic $Ag_2Mo_2O_7$ nanowire whose stacked structure consists of asymmetrical edge- and corner-shared MoO_6 chains. The nanowire possessed exceptional high crystallinity and showed activity for O_2 evolution reaction from an aqueous $AgNO_3$ solution under visible light irradiation.[1] Considering the corresponding bulky counterpart shows no photoresponse, the complete structural transformation toward nanowire will be effective in engineering the heterogeneous photocatalysts.

Biography

Kenji Saito has completed his PhD from the Department of Material and Life Science, Graduate School of Engineering, Osaka University in 2007. Then he has worked for five years for the Department of Applied Chemistry, Faculty of Science, Tokyo University of Science as an Assistant Professor. Also, during the period of 2009 to 2013, he worked as a concurrent researcher of PRESTO (Precursory Research of Embryonic Science and Technology) project of JST (Japan Science and Technology Agency). He has been working at Niigata University as a tenure track Assistant Professor since 2012. He has thus far published a total of 33 peer-reviewed papers.

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