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# Rational design of metal oxide nanomaterials for sustainable applications

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**Venue: Room 232, 3F Faculty of Engineering Bldg. 2**

## Abstract:

Metal oxides are known to possess unique functionalities that are absent or inferior in other solid materials. Their nanostructures have emerged as an important class of materials with a rich collection of properties and general potential for device applications. In this presentation, we will show our recent results on the rational design of the diverse morphologies of the typical metal oxides, like  $\text{TiO}_2$ ,  $\text{ZnO}$ ,  $\text{WO}_3$ , etc, with 1D, 2D, and 3D architectures, based on the precise controlling of the starting solutions, to meet the materials requirements for high-performance sustainable environmental and energy applications. Particularly, a generalized and fundamental approach to molecular self-assembly synthesis of ultrathin 2D nanosheets of transition metal oxides is developed by rationally employing lamellar reverse micelles. These metal oxide nanostructured materials offer huge surface to volume ratios, favourable transport properties, altered physical properties, and confined quantum size effects, and thus boost the performance of energy harvesting and storage.



## Short Biography:

Dr. Ziqi Sun is currently an Associate Professor and ARC Future Fellow at the Queensland University of Technology (QUT), Australia. His research interest includes developing bio-inspired smart nanomaterials and 2D metal oxide nanomaterials for sustainable energy and environmental applications, such as rechargeable batteries, oil-water separations, and catalysis. Ziqi received his PhD degree on Materials Science and Engineering from Institute of Metal Research, Chinese Academy of Sciences in 2009. After one-year experience as NIMS postdoctoral fellowship (Japan) on solid oxide fuel cells, he joined University of Wollongong (UOW), Australia in 2010 and moved to QUT as a faculty member in 2015. Ziqi also serves as the Editor of *Sustainable Materials and Technologies* (CiteScore = 8.31, Elsevier), Principal Editor of *Journal of Materials Research* (MRS), Associate Editor of *Surface Innovations* (ICE), Editorial Board Member of *Scientific Reports*, *Journal of Materials Science and Technology*, and *Nano Materials Science*.

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