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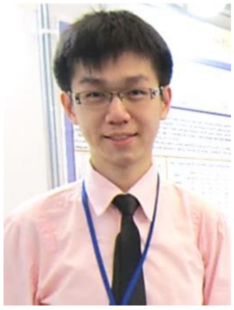

Biography

Wee-Jun Ong received his BEng and Ph.D. degrees in Chemical Engineering from Monash University in 2012 and 2016, respectively. In 2015, he was a Visiting Research Fellow in University of New South Wales and in Monash University Clayton Campus, Australia. In 2016, he became a Research Scientist in Institute of Materials Research and Engineering (IMRE) under Agency for Science, Technology and Research (A*STAR) in Singapore. At present, he is the Associate Editor for Frontiers in Materials, Editorial Board Member for Scientific Reports, and Community Board Member for Materials Horizons. Since 2013, he is an active early career researcher who has published more than 25 journal papers with citations over 1300 times and h-index of 17. His research interests primarily focus on photocatalytic, photoelectrochemical and electrochemical water splitting and CO_2 reduction for energy conversion and storage.

Graphitic carbon nitride (g-C_3N_4)-based nanocomposites for artificial photosynthesis toward renewable energy production

In this 21st century, the exploration of renewable energy to replace the traditional fossil fuels is of scientific significance. Amid the available renewable energy techniques, the utilization of clean solar energy for artificial photosynthesis is regarded as one of the auspicious strategies to combat the onslaught of climate change and surmount the contemporary descending resources of fossil fuels. In view of the massive potential of "solar + water/CO_2 → energy fuels", photocatalysis has been categorized as the "Holy Grail" of modern photochemistry, which has underpinned incessant research fascination for the past few decades. Recently, graphitic carbon nitride (g-C_3N_4) has spurred a renaissance of interest in the realm of energy production due to its compelling properties such as its earth-abundant nature, non-toxicity and moderate band gap of around 2.7 eV with visible light activation.[1,2] In this talk, the state-of-the-art research advancement in our laboratory toward effective photocatalytic solar energy conversion (i.e. CO_2 reduction and H_2O splitting) using g-C_3N_4-based nanocomposites will be systematically presented. Various modification methods of pristine g-C_3N_4 will be discussed. This includes: the incorporation of metal-free carbonaceous nanomaterials (e.g. two-dimensional (2D) graphene[3,4] and zero-dimensional (0D) carbon nanodots[5]), the hybridization of another semiconductor photocatalyst,[6] the coupling of transition metal phosphides (e.g. Ni_2P, $Ni_{12}P_5$ and Co_2P) and so forth. In short, the present studies open up a new invigorating prospect toward intelligent design of g-C_3N_4-based nanocomposites with ameliorated charge separation and migration in CO_2 reduction and water splitting, which can be extended to various energy-related applications such as solar cells, photovoltaics and electrocatalysis.

References:

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4 W.-J. Ong, L.-L. Tan, S.-P. Chai, S.-T. Yong and A. R. Mohamed, *Nano Energy*, 2015, 13, 757-770.

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