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National Centre for Synchrotron Science



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Development of Efficient Semiconductor Photocatalysts for Solar Energy Capture

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Global energy concerns motivate the development of new and improved technologies for solar energy capture, with semiconductor photocatalysis expected to make an important contribution towards satisfying the energy needs of future societies. This talk will overview some of our recent research aimed at photocatalyst development for H₂ production in alcohol-water mixtures, focussing primarily on transition metal oxide (TiO₂), oxynitride (LaTiO₂N, TaON) and nitride (Ta₃N₅) systems. The potential of 2D nanosheet photocatalysts made from earth-abundant elements, especially layered double hydroxides (M₂+M₃-LDH, where M₂⁺ = Ca²⁺, Mg²⁺, Mn²⁺, Fe²⁺, Co²⁺, Ni²⁺ or Zn²⁺ and M₃⁺ = Al³⁺, Ga³⁺ or Fe³⁺) and graphitic carbon nitride (g-C₃N₄), for future solar energy harvesting and fuel production will also be explored. Strong emphasis here will be placed on the importance high resolution transmission electron microscopy (HRTEM), synchrotron-based X-ray spectroscopies (XPS, NEXAFS, EXAFS) and supporting DFT calculations to the understanding of photocatalyst function and ultimately performance optimization via exploitation of structure-activity relationships.

Keywords or phrases (comma separated)

Are you a student?

No

Do you wish to take part in the Student Poster Slam?

No

Are you an ECR? (<5 yrs since PhD/Masters)

No

What is your gender?

Male

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