

Development of New nanostructures composites photocatalysts for solar fuel production

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Abstract: No materials system exists today that can directly convert carbon dioxide and water using energy from sunlight into a storable and transportable fuel with the requisite efficiency, reliability and scalability, to enable its manufacture at a globally significant level and at an economically acceptable cost. Yet nature performs this miraculous task every single day by photosynthesis in plants, providing fuel, food and oxygen to enable the existence of humanity on earth. The objective of this program of research is to discover a new class of photocatalysts made of earth-abundant, scalable, low cost, sunlight stable and non-toxic materials that can generate at a globally significant rate, selectivity, efficiency and scale, solar fuels, such as methanol or methane in an 'artificial photosynthetic' process. This research offers more practical solution for resolving the intertwined greenhouse gas and energy problems that humanity faces today.