Semester Project at the Thin Film and Interfaces Group

Inorganic-Biological Hybrid Species for Solar Water Splitting

For the Thin Film and Interfaces Group in the Paul Scherrer Institute, we are looking for a:

Semester or Master Student

The semiconductor material is the main part of any system harvesting solar energy, which transforms absorbed solar photons into excited electronic states. Biological systems provide an environment to operate in a more complex, yet more efficient fashion compared to many synthetic catalysts. Thus, a platform for solar fuel development must combine the best of both systems: the light harvesting capabilities of semiconductors with the catalytical power of biology, known as inorganic-biological hybrid systems for semi-artificial photosynthesis [1].

We plan to use inorganic semiconductors, such as oxynitride photoanodes, to be combined with biological species for solar hydrogen production. Gas chromatography, spectroscopy and photo-electrochemical methods will be used to characterize the experiments.

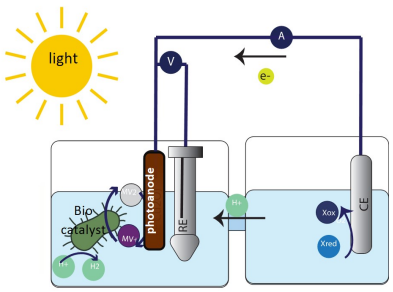

Figure 1: Photocatalytic H_2 production by the combination of a photocatalyst, methyl viologen, and the enzyme containing bacteria

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References

[1] K. K. Sakimoto, A. B. Wong, and P. Yang, "Self-photosensitization of nonphotosynthetic bacteria for solar-to-chemical production," vol. 351, no. 6268, 2016.