

Towards Artificial Cells powered by Solar Energy: Photosensitization and Photocatalysis in Bioinorganic, Bio-organometallic and Biomimetic Systems

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Abstract

Inorganic photochemistry has experienced an enormous progress within the last decades. Many branches of current frontier science including sustainable chemistry, solar fuel production or fundamental research in the life-sciences depend on light-responsive metal complexes. More recently, the various aspects of bioinorganic and bio-organometallic photochemistry have been systematically explored to create artificial enzymes [1,2].

In the present talk, an attempt is made to provide some unifying concepts and rational design guidelines for the development of novel biomimetic and bioinspired systems controlled and driven by photons. Spectral sensitization of such photo-processes remains a central challenge for utilizing sunlight as the energy source for enzyme mimetics, artificial photosynthesis and chemical photocatalysis [3]. Therefore, a brief overview on selected bioinorganic chromophores and their robust synthetic counterparts is provided. The integration of earth-abundant resources and the current search for novel (photo)catalysts based on non-precious metals and environmentally benign materials will also be highlighted as one of the most decisive design principles.

Keywords: *Solar Photochemistry, Bio-inspired Catalysis, Photoinduced Multielectron Transfer, Light-Harvesting, Artificial Photosynthesis, Synthetic Enzymes*

References

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Biography

Prof. Günther Knör received his doctorate in 1994 working in Regensburg and Bologna on the Photocatalytic Production of Solar Fuels. After PostDoc research on Artificial Photosynthesis in Stockholm, he introduced the new concept of Light-driven Enzyme Model Compounds (Habilitation 2001). He became a University professor in Vienna and Erlangen. Since 2006 he is full professor of Inorganic Chemistry and director of the Photochemistry Center at Johannes Kepler University Linz (JKU) in Austria.