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SelOxCat research group (Chemistry Dept., UAB)

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The **SelOxCat** group (https://seloxcat.com/group/) focus its attention in the design and preparation of molecular or colloidal systems and hybrid materials to be applied as redox catalysts in artificial photosynthesis. The group is particularly interested in the study, understanding and development of the key reactions for the cost-efficient production of renewable carbon-neutral fuels (H_2, $CH_3OH\cdots$) from water, CO_2 and sunlight, such as the oxidation of water to molecular oxygen, the reduction of protons to hydrogen or the reduction of CO_2 into various fuels.

We use a wide range of techniques, including various spectroscopic methods, electrochemistry, electron microscopy or X-ray crystallography, in order to understand these processes at the molecular or atomic level. The SelOxCat group tackles this major issue from two different perspectives:

Nanoscaled molecular-material hybrid (photo)electrocatalysts: We work with tailored molecular-capped metal/metal oxide nanoparticles (NPs) with tuneable properties. Our aim is to understand the fundamental principles that determine the selectivity, efficiency and durability of these hybrid materials.

Molecular-based (photo)electrodes: Our group also deals with novel catalyst-electrode interfaces to boost their current densities and long-term stabilities, in order to enable their inclusion in practical photoelectrochemical (PEC) devices.

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