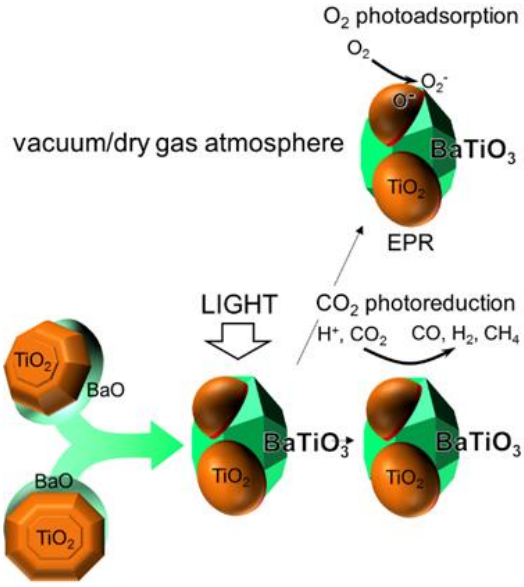
PARIS LODRON UNIVERSITÄT SALZBURG

Charge Separation in Graded Metal Oxide Nanocomposites –

PhD positions available at PLUS (Austria)



Overview: Ferroelectric materials can enhance charge separation due to spontaneous polarization effects, which are well-suited for photocatalytic applications. This proposal will investigate the influence of graded metal oxide transitions between a ferroelectric $BaTiO_3$ and a paraelectric TiO_2 phase.

Two materials systems will be studied: (i) nano-particle powders and (ii) layered nanohole films with tunable porosity, composition, doping and supported on planar substrates. Complementary test assays will be used to establish figures of merit for the materials' photoactivities, including electron para-magnetic resonance (EPR) in conjunction with O_2 or CO_2 adsorption, providing site-specific information about paramagnetic defects and photogenerated surface radical; This proposal in-volves the groups of *G. Bourret*, expert in nanostructuring and optical materials, and *O. Diwald*, expert in nanoparticles, photocatalysis and in-situ spectroscopy. With this integrated approach we will provide an unprecedented coherent description of the generation, separation and chemical utilization of charge carriers in composite nanostructured metal oxides in the context of CO_2 conversion.

Location. Department of Chemistry and Physics of Materials, University of Salzburg, Austria

Your profile: MSc. in Materials Science, Chemistry, Physics or Materials Science (preferred). Experience with metal oxides, surface chemistry and heterogeneous catalysis is a strong plus.

Application package. Please email the following to oliver.diwald@plus.ac.at: most recent CV, motivation letter, contact details of two senior persons who have worked with you.

Salary. Annual gross salary: €40860. **Start date.** February 1st 2023 or later.

Information on the research groups here:

Oliver Diwald: https://www.plus.ac.at/chemie-und-physik-der-materialien/staff-2/a-bis-d/diwald/
Gilles Bourret: https://sites.google.com/view/gillesbourret-nanomaterials/

For questions and inquiries, please contact Oliver Diwald directly at oliver.diwald@plus.ac.at