

Title: Synthetic tissue-like materials harvest light

About the project or challenge area

Oxygen makes up only one-fifth of the air we breathe but is the most vital component, and it does seem to be declining due to human activities. Oxygen is present in our atmosphere primarily because of water oxidation performed by photosynthetic organisms that use solar light and one specialized protein complex, the photosystem II (PSII). Being able to artificially reproduce this chemistry with the same efficiency is a long-sought scientific dream and would solve numerous challenges that humankind is currently facing. In the past decade many efforts have been put in the development of photo-redox catalysts that mimic the activity of PSII, but the generation of bio-inspired materials from these catalysts still presents considerable challenges. In this project we want to develop the first methodologies to use photo-redox catalysts to generate cell-like entities (protocells) capable of photo-assisted water oxidation. We will then develop methodologies to assemble these protocells into self-standing tissue-like materials that will be capable of using light to transform water into dioxygen and protons.

Why chose this opportunity?

The project is highly multidisciplinary, and the student involved will broaden their chemistry skills. More specifically, they will learn about biomaterials chemistry, photo-catalysis, and analytical chemistry, which are all highly desirable skills in the chemical industry. Full training will be provided for all aspects of the project.

By joining the research group of Dr Gobbo, the student will be part of a dynamic, multidisciplinary, and multicultural learning environment, and they will work with top researchers in materials chemistry and photocatalysis from across the world. In addition to your supervisory team a mentor will be assigned to the student for the duration of the project. The mentor will provide support and help to troubleshoot any issue that may arise from the project, and identify any additional training needs or opportunities. Overall, this will help the student to improve their chemistry, teamwork and networking skills. Finally, the student will improve their oral and written communication skills by presenting and group meetings, and by participating at local seminars, symposia and conferences.

About you

You will have skills and knowledge in catalysis, soft-materials chemistry, analytical chemistry, teamwork and time management. These skills are desirable but not essential.

Bench fees

A bench fee of £4000 is required. A small number of School of Chemistry Bench fee bursaries are available to part-cover bench fees.

How to apply: To make a formal application, follow the 'Start a new application' link on this page: <http://www.bristol.ac.uk/study/postgraduate/apply/> and include "Pierangelo Gobbo" in the "preferred supervisor" box.