| Session | Materials Science in Glass (II) |
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| Chair | Osman Burak Okan |

# Use of Controlled Dissolution Glasses for Marine Habitat Restoration

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## Biography

Chris leads the GTS R&D and Projects Team, managing and participating in a wide variety of projects ranging from desk-based research through to practical laboratory, pilot scale development, site trials and testing. He also regularly undertakes non-standard testing and consultancy work. His background is in Marine Biology and Environmental Science but has wide ranging interests from recycling and environmental improvement to novel uses of glass in biomedical applications, energy generation and photonics. Recent projects have included Secondary Raw Material Development for Glass and other foundation industries, waste and energy minimization projects for European Glass Manufacturers, the Horizon 2020 FISSAC Construction Industry Industrial symbiosis project and developing a manufacturing facility for novel biomedical and photonic glasses. Chris is a member of the Institute of Environmental Sciences.

## Abstract

This research investigates the use of glass-based technologies to contribute to the restoration of marine habitats and so create marine carbon sinks to capture carbon from the atmosphere. This has the potential to offset emissions from the industry and provide future sources of fuel, food and raw materials.

The use of controlled dissolution glasses for manipulating biological processes is well established in the biomedical field. In this piece of work, supported by RFF Oslo, the authors set about to test the feasibility of using this exciting aspect of glass chemistry to stimulate the regeneration of light deprived and eutrophic marine ecosystems in Oslo Fjord, Norway.

Glasses were prepared based on a literature review of nutrient requirements of macroalgae species identified as contributing to health and balanced ecosystems in the area which are currently struggling due to pollution from agricultural and urban land run off.

The glass systems were tested in sea water aquaria under different temperature and light regimes in both the UK and Norway. Macroalgae specimens and seawater samples were collected from the UK and Norwegian coasts and allowed to equilibrate in the laboratory prior to addition of the glass treatments.

Water quality and biomass change were monitored over a period of 3 months and compared to a baseline system containing no glass.

Over this period the glass containing systems exhibited improvement both in water clarity and increase in biomass compared to non-glass systems. DNA analysis of microalgae present in the different tanks also showed the potential of the glasses to influence the species present in the water column opening the possibility of harnessing this to further support regeneration, amongst a host of other possible uses.

We will present the latest findings of our second phase research to the conference and outline our thoughts for further work in this area.