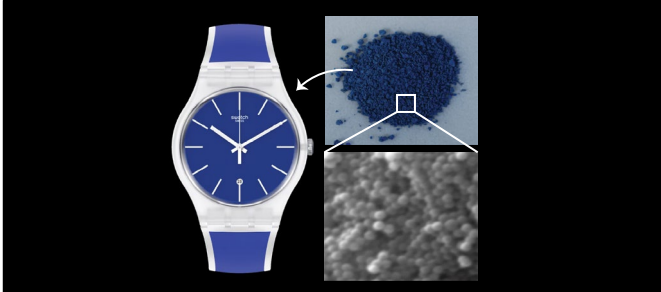


Collaboration Opportunity

Structurally Coloured Ceramics



Summary

We are developing 'structurally coloured' ceramic materials using biocompatible ingredients. We believe that these could be used in visible watch components, such as the dial or the hour markers.

Structural colors arise from the interaction of light with the microstructure of a material, via constructive interference. We leverage this phenomenon to create new colorants.

Starting from colloidal suspensions based on silica, we create a glaze-like suspension, apply it to ceramic samples, and bake, following a process similar to traditional pottery. In this way we have successfully coated and baked blue ceramic samples.

Background

Ceramic materials have been part of everyday life for thousands of years. The colorants used in them must resist the high temperatures used for baking the clay. Typically, these are inorganic materials, such as metal oxides, several of which are toxic.

Our structural colours can be used in sustainable glaze. They are based on bio-compatible materials that resist heat. These structural colours can be long-lasting if the primary materials are stable under sunlight, a property that can be found in readily available materials.

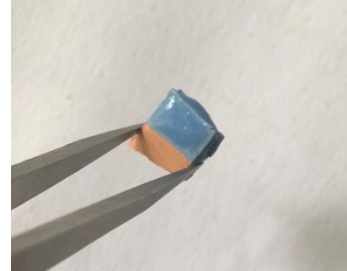
Moreover, because the colours depend largely on the microstructure, it is possible to create different colours using the same primary ingredients, facilitating production and waste disposal.

Innovation Project

We are currently investigating the resistance of our colours to temperatures where 'traditional' recipes for structural colour are expected to fail.

We propose a collaborative project with the objectives of creating samples with the dimensions required for a watch component, evaluating their compatibility with production and daily use, and expanding the palette to include colors of different intensity and hue.

To achieve these goals, we will leverage our experience in the design and characterization of photonic materials. Several methods to create different structural colours are already known, and we will adapt these to the present application. In our fundamental studies, we are actively investigating the physical parameters that lead to the most saturated colors, and we will apply this knowledge to the project.



Team

The project is lead by Dr Sofia Magkiriadou, postdoctoral researcher in the Soft Matter and Photonics Group lead by Pr. Scheffold in the Department of Physics. The group has expertise in optical materials, both from a theoretical as well as from an experimental perspective. As a physicist Dr. Magkiriadou has a long-standing interest in structural color, which was also the topic of her PhD thesis.

Publication

Publications in progress.

Developed by Dr. Magkiriadou and Prof. Scheffold

Department of Physics, University of Fribourg
Chemin du Musée 3, 1700 Fribourg, Switzerland

sofia.magkiriadou@unifr.ch

+41 26 300 92 57

How to collaborate with UNIFR :

- Innosuisse [with implementation partner](#)
- Innosuisse : [Innocheque](#)
- UNIFR [Collaboration Agreement](#)