

Soap film artificial photosynthesis research granted EUR 3.2 million

A research project led by Uppsala University has been awarded a EUR 3.2 million grant by the European Commission. The aim is to create renewable solar fuel using soap foam, carbon dioxide and sunlight.

- SoFiA (Soap Film-based Artificial Photosynthesis) aims to build a small-scale demonstrator device that will be able to produce solar fuels and raw materials for chemical industries using only sunlight, water and CO₂.
- The SoFiA concept mimics the thylakoid membrane in leaves and uses molecular catalysts made from earth abundant materials, to form self-assembled photo catalytic surfaces with designed soap foams.
- Coordinated by Professor Leif Hammarström at Uppsala University, the interdisciplinary project features 8 partner institutions from 6 different countries. SoFiA was launched 1 January 2019 and will run for 4 years.

The world's energy demand is expected to double by 2050. We need clean energy, and a potential solution is given by the sun. The best way to store solar energy in large amounts and for long periods of time is in fuels, which are 1–2 orders of magnitude more energy dense than the best batteries.

Artificial photosynthesis is a method for capturing and storing energy from the sun in chemical bonds of a solar fuel. SoFiA (Soap Film Based Artificial Photosynthesis) approaches a scientific solution through biomimicry of the thylakoid membrane in leaves using designed soap films containing soap/surfactant class molecular catalysts made from earth abundant materials. SoFiA then approaches an engineering solution by biomimicry of trees performing natural photosynthesis with leaves, using innumerable renewable surfaces created by constantly regenerating soap foam.

“SoFiA bridges distant scientific disciplines such as business management, environmental and socio-political sciences, and fine arts,” says Project Manager Dr. Indraneel Sen.

The World Economic Forum 2017 listed “Fuels from Sunlight” as the no. four of top emerging technologies. Today, artificial photosynthesis is explicitly supported by the European Commission through The European Energy Research Alliance Joint Program “Advanced Materials & Processes for Energy Applications”. Project SoFiA is funded by the European Commission, specifically in the FET OPEN 2018 call within the Horizon 2020 program.

The SoFiA consortium features four leading European universities (Uppsala University, University of Cambridge, University of Leiden, Politecnico di Torino), one European research institute (NWO-I AMOLF), one international research institute (UNESCO-ICTP) and two European SME (Teclis Scientific, Microfluidic ChipShop). The final objective of the consortium is the validation of a prototype capable of transforming CO₂ into fuel and renewable feedstock for industry, in a sustainable and cost-efficient way.