EBIO Newsletter

Biofuels Through Electrochemical Transformation Of Intermediate Bio-Liquids

Issue 5 / January 2024

EBIO is a four-year project that is part of the European Union's Horizon 2020 Research and Innovation Programme. It is set to be a game changer in the field of biofuel production with the aim to generate energy dense biofuels through electrochemical transformation of intermediate liquified biomass.

The project launched in December 2020 with a budget of around 4 million euros. After some Covid-19 pandemic related start-up challenges, the project has successfully brought together partners from all over Europe, and has successful reached its final year of research, all with the same goal: to turn low value crude bio liquids into sustainable road transport fuels.

The consortium is built on strong foundations of research, innovation, and industrial knowledge. It consists of nine beneficiaries from seven different countries, among them some of the world leaders in the field.

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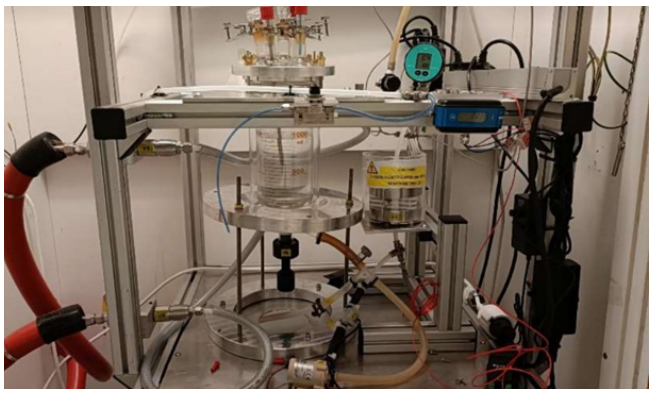
1. EBIO Third Press Release: Sustainable Electrochemistry from Lab to Demonstration Scale

On the 27th November 2022, EBIO published the projects second press release in which the project presents its successful implementation of the electrolyser design from lab to demonstration scale.

The full press release can be read here: Press Release #3

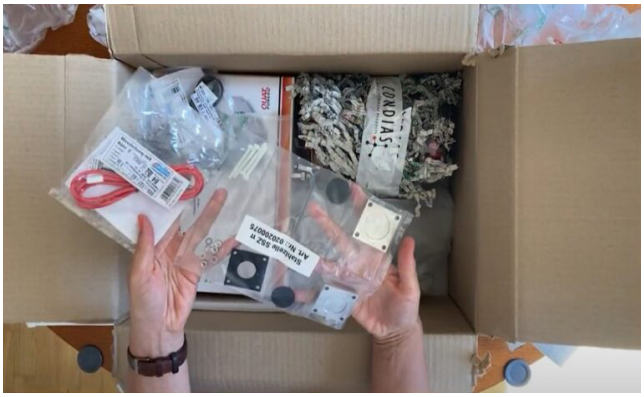


Small pilot scale setup for continuous electrochemical lignin depolymerization.

2. Electro-synthesis: the CONDIAS Synthesis Starter Kit with DIACHEM(R) BDD anode

In September 2023 a video was made showing in simple terms how a Steel Sandwich Cell with a DIACHEM® anode, provided by project partners CONDIAS, can with just a few parts of relatively basic equipment carry out electrosynthesis. The process is modular, simple, adaptable, and easy to implement. It was this exact starting point that has led to the demonstration scale electrolyser presented in the third press release.

The full video can be watched here: Electro-synthesis video



The CONDIAS Synthesis Starter Kit.

3. A Busy year for EBIO PhD Candidates

In 2023 Talal Ashraf and Elisabeth Oehl presented their research at least eight different European conferences. A summary of the events since Newsletter #4 are presented below:

- Elisabeth Oehl presented at Renewable Resources and Biorefineries 2023 in Riga, Latvia, 31 May – 2 June. Presentation abstract: Electrocatalytic kraft lignin conversion dissolved in industrial black liquor
- EBIO presented three posters at the 14th European Congress of Chemical Engineering and 7th European Congress of Applied Biotechnology, 17th – 21st September, 2023. Poster titles: Electrocatalytic valorisation of industrial black liquor, Scale up of electrochemical lignin depolymerization, Effect of electrolyte composition and electrode material on direct electrochemical lignin depolymerization.
- Talal Ashraf presented his work during the Faraday Discussion Conference in Edinburgh, Scotland, which took place from July 12-14th, 2023. Talal demonstrated an application of Boron-Doped Diamond (BDD) electrodes, showcasing their potential to enhance pyrolysis oil components.
- Talal Ashraf, presented his research at the Summer School in Interlaken, Switzerland, 28 – 31 August 2023, focusing on Organic Electrochemistry. The presented poster highlights the cations effect during Kolbe electrolysis, a critical factor in achieving remarkable faradaic efficiency for pyrolysis oil upgradation application.
- Talal Ashraf participated in the 244th Electrochemical Society (ECS) meeting held from October 8 to 12, 2023. The oral presentation titled “Investigating the Impact of Alkali Metal Cations on Kolbe Electrolysis.” explored the influence of cations present in supporting electrolytes on the electrochemical oxidation of acetic acid, a crucial component in pyrolysis.

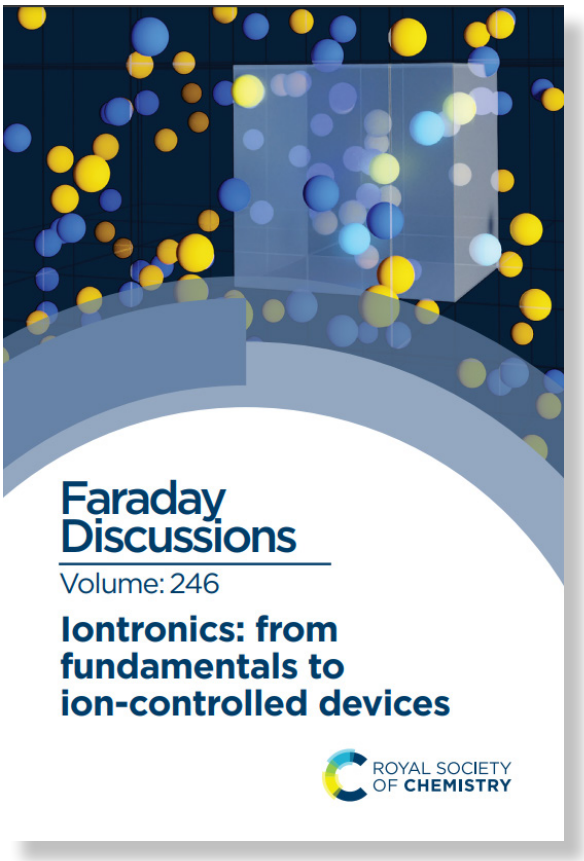
Talal Ashraf presenting at Faraday Discussions Conference

Elisabeth Oehl presenting at RRB 2023

4. EBIO Published Papers

Two more published papers for the EBIO Project:

- Electrofuels: General Discussion Based on Talal Ashraf's question and answer session held at the Faraday Discussion conference with an expert panel he was able to prepare and publish a valuable paper, designed to provide some in depth perspectives into his research on BDD electrochemically, as part of the EBIO project.
- Developing the next generation of renewable energy technologies: an overview of low-TRL EU-funded research projects Presenting a cluster of eleven research and innovation projects, funded under the same call of the EU's H2020 programme, of which one is EBIO. All of the projects are developing breakthrough and game-changing renewable energy technologies that will form the backbone of the energy system by 2030 and 2050 are, at present, at an early stage of development.



Faraday Discussions Journal Cover

5. EBIO Final year and Final Event

During the final 12 months of the project EBIO is planning webinars and several events to show case all the outstanding achievements and share valuable findings. A few highlights are listed below:

- Webinar 4 part series will run from April to October 2024.
- Podcast episode on SINTEFs research forum.
- Final event at the Nordic Wood Biorefinery Conference 2024

PROJECT PARTNERS

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EBIO H2020 Project

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