

## Research content for the short video Utopia - “**CarbonBusters turn toxic into good - 2024**”

“IMAGINE: CarbonBusters: Turning poison into something good

... Made possible by depolarised electrolysis – from flue gas to products and green hydrogen”

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#### **Depolarised electrolyzers**

This vision poses the question: why aim for carbon neutrality when green hydrogen can make us carbon negative? The most common method for producing green hydrogen is the well-known but energy-intensive process of water electrolysis.

In the SHyRE project, researchers at Graz University of Technology are working on novel, depolarised electrolyzers. These electrolyser cells operate by using a toxic gas from the atmosphere or from industrial waste gas to depolarise the electrolyser cell. In this way, the same purity of hydrogen is achieved with lower energy consumption. As an extremely valuable by-product, a chemical used in large quantities is produced (instead of O<sub>2</sub> in conventional electrolysis). By removing impurities from the atmosphere or from process streams, depolarised electrolysis actively reduces the volume of greenhouse gases emitted and converts them into a valuable compound. And all this whilst simultaneously producing high-purity H<sub>2</sub>.

Whilst this technology may appear to compete with the traditional water electrolyser, it is in fact likely to be a complementary alternative for a wide range of industries that need to clean up their emissions: mining facilities, biorefineries, and the pharmaceutical and plastics industries.

Research at the site

- SHyRE – Sulphuric acid and hydrogen production for the electronics industry through innovative recycling (Graz University of Technology)

<https://fti-ressourcenwende.at/de/projekte/kreislaufwirtschaft/shyre.php>

- Institute of Chemical and Environmental Engineering, Graz University of Technology

<https://www.tugraz.at/institute/ceet/home>