

Energy Transition within Hard to Abate Industries: Innovative pathways for the production of light olefins

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Abstract

Light olefins, such as ethylene, propylene, and butylene, are important chemical building blocks for the chemical industry, as they are used in the production of many common chemical products, such as plastics (polyethylene and polypropylene) and epoxides. Nonetheless, the adverse impacts of global warming and relative environmental pollution, which threaten human life, necessitate the investigation of alternative production pathways, aiming to reduce relative emissions and achieving the ambitious net zero climate targets. In this direction, this project aims to present an innovative pathway production of light olefins that can be adopted by hard to abate industries, aiming to put forward a new paradigm for the electrosynthesis of light olefins from H₂O and CO₂ in a single, nano-engineered, co-ionic electrochemical membrane reactor (ci-EMR). The challenges, the market potential and competitiveness assessment are discussed, aiming to lead to the creation of a roadmap that can be used by the petrochemicals and related markets, employing industrial process design, simulation and optimization, so as to present an economic and sustainable solution for industrial scale applications.

Keywords: Innovation; Market Analysis; ci-EMR; Business Models; Hard to Abate Industries

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