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## Hydrogen Production by Electrochemical Alcohol Reforming. A key solution for a decarbonization of the transport sector.

The growth of the technological civilization has been supported mainly on the use of fossil fuels, such as coal, natural gas, and hydrocarbons, for the production of both energy and chemicals. As a consequence of burning fossil fuels leads to the emission of the CO2 in atmosphere, which is a greenhouse gas and represents one of the main contributions to the global climate change. Hydrogen is considered the most significant candidate in technology innovation, economic expansion, and global progression in the 21st century. Actually, hydrogen is mainly produced from fossil fuels (natural gas, oil, and coal) by energy consuming and environmentally unfriendly industrial processes. Water electrolysis appears to be a good candidate for the production of clean hydrogen. However, the low kinetics of water oxidation, which implies high cell voltage which makes this technology expensive. Biosourced alcohols can be interesting alternatives as hydrogen carriers in an electrolysis cell; their reversible oxidation potentials are much lower than that of water, ca 0.1 V versus SHE (standard hydrogen electrode) against 1.23 V versus SHE, so that the cell voltages for hydrogen production are lower (and so is the energy consumption). One of the major objectives of the emerging hydrogen economy is the production of electricity by using hydrogen fuel cell. The (bio)hydrogen is a part of the electrical mobility and represent the key solution for a decarbonization of the transport sector. Thus, in this research topic will be focused the studies of the electrocatalytic processes involved in hydrogen production by ethanol reforming in an ionic exchange membrane electrolysis cell device.


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