

Abstract

Hydrogen is a key compound for the future as an energy vector to produce electricity in fuel cell systems, particularly proton exchange membrane fuel cells (PEMFC). These power sources have become a mature technology, and several car manufacturers are starting or planning the commercialization of fuel cell electric vehicles. However, to make these technologies really sustainable, clean methods for the production of high purity hydrogen have to be developed. Indeed, up to date ca. 96 % of hydrogen produced worldwide come from non-renewable fossil resources through thermal processes leading to greenhouse gases, such as carbon dioxide and methane, which contribute greatly to the global climate change. The production of hydrogen by water electrolysis is considered as a key alternative to these thermal methods. However, the energy needed for splitting a water molecule is very high, leading to high costs of production. The production of hydrogen by the electrocatalytic oxidation of several organic compounds such ethanol, glycerol, and glucose in an electrolysis cell, can contribute to reduce greatly the cost by decreasing the energy needed.