

## Iridium-Based Bimetallic Catalysts for Hydrogen Production through Glycerol Aqueous-Phase Reforming

**Authors :** Francisco Espinosa, Juan Chavarría

**Abstract :** Glycerol is a byproduct of biodiesel production that can be used for aqueous-phase reforming to obtain hydrogen. Iridium is a material that has high activity and hydrogen selectivity for steam phase reforming. Nevertheless, a drawback for the use of iridium in aqueous-phase reforming is the low activity in water-gas shift reaction. Therefore, in this work, it is proposed the use of nickel and copper as a second metal in the catalyst to reach a synergetic effect. Iridium, iridium-nickel and iridium-copper catalysts were prepared by incipient wetness impregnation and evaluated in the aqueous-phase reforming of glycerol using CeO<sub>2</sub> or La<sub>2</sub>O<sub>3</sub> as support. The catalysts were characterized by XRD, XPS, and EDX. The reactions were carried out in a fixed bed reactor feeding a solution of glycerol 10 wt% in water at 270°C, and reaction products were analyzed by gas chromatography. It was found that IrNi/CeO<sub>2</sub> reached highest glycerol conversion and hydrogen production, slightly above 70% and 43 vol% respectively. In terms of conversion, iridium is a promising metal, and its activity for hydrogen production can be enhanced when adding a second metal.

**Keywords :** aqueous-phase reforming, glycerol, hydrogen production, iridium

**Conference Title :** ICHPS 2017 : International Conference on Hydrogen Production and Storage

**Conference Location :** Tokyo, Japan

**Conference Dates :** September 07-08, 2017