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Contribution to Conversion of CO_2 to fuel by electro-photo-catalytic reduction in hydro-genocarbonated aqueous solution tion

Ghania NEZZAL (), Souad BENAMMAR (), Samia HAMOUNI (), Dalila MEZIANE (), Sabrina NAAMA (), and Djamel ABDESSEMED ()

(1) Faculty of Mechanical and Chemical Engineering-University of Sciences & Technology Houari Boumédiène-Algiers-Algeria (ghania.nezzal@yahoo.fr), (2) Research Center of Physico-Chemial Analysis-Tipasa-Algeria ,souad.benammar@yahoo.fr, (3) Faculty of Mechanical and Chemical Engineering- University of Sciences & Technology Houari BoumédièneAlgiers-Algeria- samiatiz15@yahoo.fr, (4) Faculty of Mechanical and Chemical Engineering-University of Sciences & Technology Houari BoumédièneAlgiers-Algeria- dal.meziane@gmail.com, (5) Develpment of Silicium Technologies Unit-National Research Nuclear Center-Algiers-Algeria-sabrina_naama@hotmail.fr, (6) Faculty of Mechanical &Chemical Engineering-University of Sciences & Technology Houari BoumédièneAlgiers-Algeria

Referring to the last World Conference COPENHAGEN (2010), endorsed by the United Nations,to " RISKS OF CLIMATE CHANGES ', states had not reached an agreement to work fairly, in an international program, to limit Carbon dioxide emissions into the atmosphere, to put off it, to the next (in 2015), the right decisions, despite the recommendations of the 'IPCC'. Based on the natural reaction of photosynthesis, which converts carbon dioxide in the presence of water and sun, to " OSA" ', it is natural that scientists believe to implement an artificial conversion of CO_2 in a renewable energy faster. Our contribution focuses on the same goals, by a different line. In this perspective, nano-materials, catalysts, pervaporation membranes, pervaporation unit, and a photo-reactor prototype, have been made. A summary of the preliminary results presented: For example, are given the concentrations of the various species present in a aqueous solution of sodium hydrogen carbonate, 0.5M, saturated with CO_2, at standard temperature and pressure: (CO_2) = 1M; ($H2CO_3$) = 0,038M; (HCO_3-) = 0,336M; (CO_3 –) = 0,34M; pH = 7.33, an overall concentration = 1,714M, more than three times that of the initial solution. It is in such conditions that the conversion of carbon dioxide by the hydrogen produced in situ by electrolysis, in fuel, must be done in the presence of catalyst, under UV radiation. For electrodes, a nano-porous layer was formed on their surface to receive the suitable catalyst. These lats prepared, are made of porous supports (montmorillonite, aluminum and silicon oxides) into which are inserted the metal precursor, by impregnation interactive, in Iron, cobalt, nickel salt solutions, cobalt, nickel. Their performance has been identified by the reduction of para- nitrophenol, to para-aminophenol in aqueous medium in the presence of sodium borohydride. This is the catalyst 'Cobalt supported by SiO_2" that gave the best conversion, 99.5% instead of 99.7%, for a platinum catalyst. The separation of hydrocarbon products, in the considered aqueous medium, continuously, has been studied to determine optimum conditions by pervaporation. For this purpose, membranes of poly-sulfone and poly-dimethylsiloxane, were prepared and characterized in terms of flow pervaporat (J), and solute / solvent separation factor (α). Thus, the developed membranes have equivalent performance to commercial membranes. More accurate results will be the subject of this communication.