O 69. DEVELOPMENT OF THE DIRECT BOROHYDRIDE FUEL CELL CATALYSTS

Sibel Uygun[1*], Hilal Kivrak[2], Özlem Sahin[1]

[1]Department of Chemical Engineering, Konya Technical University, 42079, Konya, Turkey
2 Yüzüncüyıl University, Department of Chemical Engineering, 65080, Van, Turkey.

E-mail:osahin@ktun.edu.tr

ABSTRACT: The decreasing natural gas, coal and petroleum reserves, and increasing consumption rate of these resources shows the importance of renewable energy. Although the consumption of fossil fuels is restricted because of their high carbon/sulfur contents, these restrictions are not always effective. Thus, environmental problems, such as acid rain, ozone depletion and climate change, arise from the presence of CO_2, SO_x and NO_x in the emission gases. Most of these problems can be improved by using clean and renewable energy sources. For this purpose, hydrogen seems to be the most appropriate energy source. Fuel cells using borohydride as the fuel have received much attention because of the high potential and power density. A direct borohydride fuel cell (DBFC) is a device that converts chemical energy stored in borohydride ion (BH_4^-) and an oxidant directly into electricity by redox processes. Usually, a DBFC employs an alkaline solution of sodium borohydride ($NaBH_4$) as fuel and oxygen or hydrogen peroxide as oxidant (Muir and Yao, 2011). $NaBH_4$, a safe and high energy density source of H_2 for fuel cells, requires a catalyst for reliable hydrogen production (Genga et. all, 2010). In this study, it is aimed to synthesize highly active carbon nanotube supported bimetallic catalysts (Pt-M (M: Au, Ir, Cu) for $NaBH_4$ fuel cells. The catalytic activity of these catalysts was investigated by cyclic voltammetry, chronoamperometry, and impedance measurements.

Keywords: Fuel cells, Sodium borohydride, Bimetallic nanocatalyst, Catalytic activity.

REFERENCES

Genga, X., Zhanga, H., Maa Y., Zhonga H., 2010, Borohydride electrochemical oxidation on carbon-supported Pt-modified Au nanoparticles, *Journal of Power Sources 195,* 1583–1588.

Muir, S.S., Yao, X., 2011, Progress in sodium borohydride as a hydrogen storage material: Development of hydrolysis catalysts and reaction systems, *İnternational Journal of hydrogen energy 36,* 5983-5997.