

Vol. 12 (3): 51-58 (2022)

SYNTHESIS OF THYMOL DERIVATIVES AND ITS FUEL CELL PERFORMANCE AS AN ANODE CATALYST

Kawa Hama Sharif¹, Omruye Ozok-Arici², Aykut Çağlar^{3,4}, Hilal Kivrak^{2,3,*}, Arif Kivra^{5,*}

¹Van Yuzuncu Yil University, Faculty of Sciences, Department of Chemistry, Van, 65080, Turkey;

²Eskisehir Osmangazi University, Faculty of Engineering and Architectural Sciences,
Department of Chemical Engineering, Eskisehir 26040, Turkey;

³Van Yuzuncu Yil University, Faculty of Engineering, Department of Chemical Engineering, Van, 65000, Turkey;

⁴Eskisehir Osmangazi University, Translational Medicine Research and Clinical Center, 26040 Eskisehir, Turkey;

⁵Eskişehir Osmangazi University, Faculty of Sciences and Arts, Department of Chemistry, Eskisehir 26040, Turkey;

*Corresponding Authors Hilal Kivrak, Arif Kivrak, e-mail: arifkivrak@yahoo.com; hilalkivrak@gmail.com;

Received February 2022; Accepted March 2022; Published April 2022;

DOI: <https://doi.org/10.31407/ijeess12.307>

ABSTRACT

Direct glucose fuel cells, essentially produce electricity from glucose, offer several advantage and might be employed in a range of applications. Because of stability and non-volatile, Glucose have high-intensity density. When it is oxidized water and CO₂ are formed. In the current investigation, designed and synthesized new organic anode catalyst by using Thymol derivatives. Thymol based new hybrid molecules (G1,G2, and G3) were synthesized via Sonogashira cross coupling and condensation reactions. Then, electrochemical activities and charge transfer resistances (R_{ct}) of all prepared thymol-based catalysts were studied via cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS), respectively in 0.5 M glucose alkaline solution. Thymol based organic catalysts exhibited a good current density at around 0.1 mA.cm⁻² for the 2-isopropyl-5-methylphenyl 4-oxo-4-(5-(p-tolylolethynyl)thiophen-2-yl)butanoate (G3). As a result, A new generation of ecologically friendly and alternative metal catalyst for direct glucose fuel cells is thymol derivatives-based catalyst.

Keywords: Energy, natural products, anode catalyst, electrooxidation, thymol.