

Int. J. Electrochem. Sci., 15 (2020) 1643 – 1654

**International Journal of
ELECTROCHEMICAL
SCIENCE**

www.electrochemsci.org

Dye-sensitized Solar Cell Utilizing Degussa P25 and Anatase TiO₂ films: Comparative Study of Photovoltaic Performance: Effect of N719 Dye Concentration

V.G. Maratin¹, A.M. Harun^{1,*}, M.Y.A. Rahman^{2,*}

¹ Faculty of Engineering, Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah

² Institute of Microengineering and Nanoelectronics (IMEN), Universiti Kebangsaan Malaysia, 43600, Bangi, Selangor, Malaysia

*E-mail: mukifza@ums.edu.my (A.M. Harun); mohd.yusri@ukm.edu.my (M.Y.A. Rahman)

doi: 10.20964/2020.02.49

Received: 4 October 2019 / *Accepted:* 26 November 2019 / *Published:* 31 December 2019

This work deals with the comparison of dye-sensitized solar cell (DSSC) performance utilizing Degussa P25 and anatase TiO₂ films as photoanode of the device. The effect of N719 dye concentration on the device performance has been investigated. The concentration has been varied from 0.1 mM to 0.6 mM at 0.1 mM interval. It is found that the DSSC utilizing Degussa P25 demonstrated higher performance than that of the device with anatase TiO₂. The device utilizing Degussa P25 TiO₂ performs the highest η of 1.28% at the optimum concentration of N719 dye that is 0.4 mM. This because this device possesses the highest absorption in the visible region and lowest leak current. The device utilizing anatase TiO₂ performs the highest η of 0.447% at the optimum concentration of N719 dye that is 0.5 mM. This is due to the device has the highest absorption in the visible region, the smallest bulk and charge transfer resistance at the interface of Pt/electrolyte.

Keywords: anatase, charge transfer resistance, Degussa P25, dye-sensitized solar cell, photoanode

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