

Area: Organic and Dye-sensitized Solar cell

PROPERTIES OF DSSCS AT VERY LOW INTENSITY CONDITION

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The dye sensitized solar cell (DSSC) is suitable for applications at very low light intensity condition. The purpose of this study is to investigate the optical and electrical properties of DSSC samples at very low intensity condition (VLIC). In order to test the effect of the DSSC after temperature and humidity test, some different dyes N719 and Z907 were selected for mixing TiO₂ to make DSSC samples. In our experiment, the temperature and humidity test of sample was tested by using Weiss SB22/160. The testing conditions of temperature and humidity were set 50°C/75%RH, 65°C/85%RH, 70°C/75%RH and 85°C/85%RH. The electrical properties of DSSC samples were measured by using an J-V curve meter. The light radiation condition was set at the very low intensity condition (VLIC: 60 W/m²), which is a new standard defined for applications in low light intensity radiation. From our testing J-V curves of DSSC (N719 dye) with and without temperature and humidity test, the Voc, Jsc, FF and efficiency of DSSC sample before temperature and humidity test are 0.779V, 15(mA/cm²), 64% and 6.4% respectively, and the Voc, Jsc, FF and efficiency of DSSC sample are degraded to 0.779V, 9.56(mA/cm²), 70% and 4.58% respectively after 20 hour temperature and humidity test. Also from the J-V curves of DSSC (Z907 dye) with and without temperature and humidity test, the Voc, Jsc, FF and efficiency of DSSC sample before temperature and humidity test are 0.628V, 12.15(mA/cm²), 67% and 5.14% respectively, and the Voc, Jsc, FF and efficiency of DSSC sample are degraded to 0.655V, 6.06(mA/cm²), 67% and 2.67% respectively after 15 hours temperature and humidity test. In general, the optical and electrical properties of DSSC samples are degraded obviously after temperature and humidity test for 100 hours.

Keyword: dye sensitized solar cell (DSSC), very low intensity condition (VLIC)