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Development of Textile-based Organic Solar Cell

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Organic photovoltaic cells (OPV) have been extensively studied due to their unique properties such as flexibility, light-weight, easy processability, cost-effectiveness, and being environmental friendly. These advantages make them an attractive candidate for application in various novel fields and promising development with new features. Photovoltaic cell-integrated textiles have greatly attractive features as a power source for the smart textile solutions, and OPV is most ideal form factor due to advantage of flexibility. In this study, we develop a textile-based OPV through various experimental methods and we suggest the direction for the design of the photovoltaic textile. We used a textile electrode and tried to various layouts for textile-based OPV. Finally, we determined the contact area by using Hertzian theory for the calculation of power conversion efficiency (PCE). Based on the results of calculation, the short circuit current density, I_{sc} , was 13.11 mA/cm^2 under AM 1.5 condition and the PCE was around 2.5%

Keywords: Organic photovoltaic, Textile, Hertzian theory, contact area

