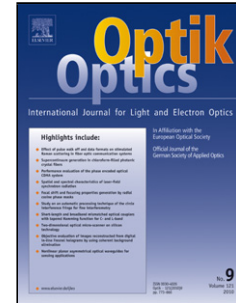


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Authors: Oluwaseun Adedokun, Yekinni K. Sanusi, Ayodeji O. Awodugba



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Solvent Dependent Natural Dye Extraction and its Sensitization Effect for Dye Sensitized Solar Cells

Oluwaseun Adedokun^{1*}; Yekinni K. Sanusi¹ and Ayodeji O. Awodugba¹

¹ Department of Pure and Applied Physics, Ladoko Akintola University of Technology, P.M.B 4000, Ogbomoso, Nigeria.

* **Correspondence to:** O. Adedokun, Department of Pure and Applied Physics, Ladoko Akintola University of Technology, P.M.B 4000, Ogbomoso, Nigeria.
Email: oadedokun@lautech.edu.ng

Abstract

In this study, we have evaluated the effect of various solvents for natural dye extraction and suitable sensitization of the same extracted dye on mesoporous TiO₂ for dye sensitized solar Cells (DSSC) applications. Twelve different extraction solvents, namely, distilled water, ethanol, acetone, methanol, acetonitrile, dimethyl sulfoxide (DMSO), chloroform, n-hexane, ethyl acetate, toluene, dichloromethane (DCM) and isopropanol were employed to extract natural dyes from *Punica granatum* (pomegranate) peels, *Citrus reticulata* (tangerine) peels and *Parquetina nigrescens* (African parquentina) leaf. The polar solvents like; distilled water, methanol and ethanol were found to perform best to extract betacyanin dye from *Punica granatum* peels while the non-polar solvents like; dichloromethane and chloroform extract the most carotenoid and chlorophyll from *Citrus reticulata* peels and *Parquetina nigrescens* leaf, respectively. The natural dye extraction process was analyzed using UV-Vis and photoluminescence spectroscopy. Further the extracted dye sensitization over TiO₂ was monitored with solvent dependent surface wettability chemistry using contact angle measurements.

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