

## **E1-02 Nano-porous solid-state photovoltaic cell sensitized with tannin**

K Tennakone, G M L P Aponsu, G R R A Kumara, I R M Kottegoda, V P S Perera, K G U Wijayantha  
*Institute of Fundamental Studies, Kandy*

A fully solid-state dye-sensitized photovoltaic cell nano-porous n-TiO<sub>2</sub>/tannin/p-CuI was constructed by sandwiching the tannin between p-CuI semiconductor and n-TiO<sub>2</sub>.

In constructing the cell, as the first step nano-porous TiO<sub>2</sub> layers were coated on conducting tin oxide (CTO) glass plate. TiO<sub>2</sub> coated CTO glass was then kept immersed in a tannin solution, and boiled for 1 min. CuI dissolved in moisture free acetonitrile was spread on the tannin coated TiO<sub>2</sub> plate kept on a hot plate heated to 150°C. Electrical contact to the CuI surface was made by pressing a gold or graphite coated CTO glass on to the CuI surface and sealing the cell with epoxy resin.

The cell generates short-circuit photocurrent ~ 1.8 mA/cm<sup>2</sup> and open-circuit voltage ~ 480 mV. The photovoltage of n-TiO<sub>2</sub>/tannin/p-CuI is more stable than that of n-TiO<sub>2</sub>/cyanidin/p-CuI due to firm bonding of tannin to surface TiO<sub>2</sub> than cyanidin.

The above cell is still far away from a practical solar energy conversion device. Energy conversion efficiency of the cell (~ 1%) is even smaller than that of the cyanidin sensitized cell. However, the higher stability of photovoltage suggests that firm adhesion of the dye to TiO<sub>2</sub> nano-crystallinities is essential for suppression of internal short-circuiting.