

Encapsulation System for Organic Photovoltaic Devices/Panels

Organic semiconductors are recognized as emerging materials for variety of electronic devices and displays. These have the potential of making large area photovoltaic panels on large glass sheets, metal foils and polythene sheets. This will lead to cost effective manufacturing of solar modules and panels in comparison to existing technologies. To make this happen, besides increasing the efficiency of basic devices; lifetime, durability and reliability are important aspects of this technology. Organic materials in general are much more sensitive to oxygen and moisture. The problem extenuates when current is passing through it. To overcome this problem and to test different materials for their application and ruggedness for photovoltaic applications, it is imperative that the devices and panels are encapsulated under <1 ppm level of oxygen and moisture levels. To meet this end, an encapsulation system has been conceptualized, designed and installed in Semiconductor Device Lab, EE Department, IIT Kanpur. It maintains oxygen and moisture levels <0.1 ppm levels. It consists of two Glove Boxes consisting of (i) a Vacuum Oven to drive out the embedded moisture and oxygen in glass plate/foils/polythene sheets, (ii) UV ozone cleaner to clean the surface, (iii) a semi-automatic UV epoxy dispenser, (iv) platform to integrate the device/panels to covering glass plate and then (v) a UV lamp to cure the epoxy. The system has been integrated to another Evaporation cum Sputtering system for fabricating the organic devices and then transferring the same under <0.1 ppm level to Encapsulation system. It is ready for use. A photograph of the system is given below.

