

ABSTRACT

Low concentration photovoltaic (LCPV) systems have the potential to reduce the cost per kWh of electricity compared to conventional flat-plate photovoltaics (PV) by up to 50%. The cost-savings are realised by replacing expensive PV cells with relatively cheaper optical components to concentrate incident solar irradiance onto a receiver and by tracking the sun along either 1 axis or 2 axes. A LCPV module consists of three interrelated subsystems, viz., the optical, electrical and the thermal subsystems, which must be considered for optimal module design and performance. Successful integration of these subsystems requires the balancing of cost, performance and reliability. In this study LCPV experimental prototype modules were designed, built and evaluated with respect to optimisation of the three subsystems and overall performance. This paper reports on the optical and electrical evaluation of a prototype LCPV module.