Abstract

In solar cells, front contact metallization plays important role in its fabrication process because of its implication in the series and shunt resistances. Series resistance is one of the factors which affect the performance to a great extent. It is observed that fill factor reduces up to 40%, on the series resistance varies in from 2Ω-cm^2 to 8Ω-cm^2. It is also found that around 40% of total solar cell processing cost is due to metallization using conventional techniques. Front contact metallization is even more important due to the lower contact area and in turn higher share in total series resistance, so having higher efficiency improvement potential.

Nickel-Copper two step metallization is found to be useful for low cost metallization without affecting the cell performance. It observed that the conventional electroless nickel deposition has been done in in the presence of ambient light. Here the nickel is deposited on n-type emitter in the presence of ambient light which affects the quality of deposition due to photovoltaic effect. The deposition quality varies with the variation of intensity. In this work, it is mainly focused to objective the effect of light on electroless Ni deposition on n-type solar cell for front side metallization. Electroless nickel deposition is carried out under different light conditions on half processed n-type silicone solar cells, where dark condition is found to be better. Also, the crystallites of nickel film depends on the phosphorus content i.e. lower Phosphorus content results in more crystalline in electroless nickel deposition process while dark condition results in higher nickel content and lower phosphorus content, which is analyzed by EDS data. The samples are characterized by Scanning Electron Microscopy (SEM), Energy Dispersive X-ray Spectroscopy (EDS) etc.