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THIN FILM SILICON TANDEM SOLAR CELLS ON FLEXIBLE SUBSTRATES: REALIZATION AND ELECTRON IRRADIATION

Abstract

Thin film silicon based solar cells on flexible substrates have several advantages such as high specific powers and easily being fabricated by roll to roll methods. In order to increase the efficiency of solar cells, tandem structure are usually used. Amorphous silicon/microcrystalline silicon tandem solar cells on flexible substrates with conversion efficiency of more than 12 percent and amorphous silicon/amorphous silicon germanium more than 11 percent are obtained. With the scale-up, conversion efficiency of amorphous silicon/microcrystalline silicon tandem solar cells has reached more than 7 percent. At the same time, the tandem solar cells are irradiated by 1MeV-Electron irradiation. The degradation of conversion efficiency is lower than 15 percent. It is proved that thin film silicon tandem solar cells on flexible substrates can be applied in space environment.