

Abstract

Flexible thin film solar cells represent the future. This study concentrates on making CuInSe₂ based solar cells non rigid by depositing the rear molybdenum contact onto inox 316.

In order to overcome the Inox316 disadvantages such as the metallic impurities diffusion and the surface roughness, a bi-layer TiN/Ti have been introduced between the Mo rear contact and Inox 316. Two techniques have been employed: spray pyrolysis for CuInSe₂ and by cathodic magnetron sputtering for Mo/TiN/Ti. CuInSe₂ layers deposited onto glass substrates present high crystallinity with (112) preferred orientation at 550 °C. However, these properties disappear for CuInSe₂ on Inox316 with missing peak (112) and fall in the ratio Se/Cu from 1.9 to 1.1.

According to EDS analysis, these results may be due to the Fe and Cu diffusion from Inox316 to CuInSe₂ film, this is why the presence of TiN/Ti bi-layer improves the surface condition of Inox 316 and reduces Iron presence from 9.7 % to 1.9 % and Cr from 3.8 % to 0.5 %; this confirms its efficiency to improve the solar cell performance using Inox316 substrate.