DEVICE STRUCTURE AND PROCESS CONTROL FOR CIGS SOLAR CELLS ON FLEXIBLE SUBSTRATE

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Cu(In,Ga)Se2 (CIGS)-based PV has been considered as one of the most promising of solar cell technologies for realizing large-scale power generation based on the potential of low-cost manufacturing, the high efficiencies, and wide range of applications. Recently, worldwide rapid increasing demand for sustainable energy generation has led the emergence and spread of mobile/portable power sources, building-integrated PV, and vehicle-integrated PV. Even any space, where light is available, is considered as a potential candidate for electricity generation. In respect of the emerging demands, CIGS-based PV should be qualified for some criteria. One crucial requirement is to make lightweight CIGS PV modules in order for expanding the range of application. This talk will introduce our recent efforts to achieve highly efficient CIGS solar cell/module on the flexible polyimide substrate. Making the CIGS absorber on the polyimide requires delicate handling and process control for preventing stress and adhesion issues. With a modified co-evaporation of CIGS in conjunction with a new Mo back contact design, flexible CIGS solar cells with controlled microstructure and high device performance have been obtained. We will also talk about our ongoing efforts to achieve further device improvement and to demonstrate reliable and lightweight CIGS PV modules.