Process Study for the Fabrication of GaAs Solar Cells

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ABSTRACT

Heavily doped n+-GaAs material plays important role in optoelectronics for the formation of ohmic contacts. Gold always is the popular metal for the electrode formation in the fabrication of optoelectronic devices. Regarding to solar cells, about 10% of cell area is covered with metal electrodes. In order to reduce the fabrication cost, cheaper metals shall be adopted for the formation of metal electrodes on solar cells. In this work, three kinds of metal combination, including Ni/Ag/Au, Ni/Al/Au, and Ni/Cu/Au, were deposited on n+-type GaAs to form non-alloyed ohmic contacts and be characterized, respectively. All samples were thermal treated with various different temperatures and times to evaluate the thermal stability. The characteristic contact resistances (ρ c) were characterized by transmission line model (TLM). The inter-diffusions between metal and semiconductor after thermal treatment were characterized by X-ray diffractometer (XRD).

Keywords : non-alloyed ohmic contact ; anneal ; transmission line model

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