

GaAs Based Solar Cells: Growth, Fabrication, and Characterization

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Abstract : The sun is one of the latest developments in renewable energy sources, which has a variety of application. Solar energy is the most preferred renewable energy sources because it can be used directly, it protects the environment and it is economic. In this work, we investigated that important parameter of GaAs-based solar cells with respect to the growth temperature. The samples were grown on (100) oriented p-GaAs substrates by solid source Veeco GEN20MC MBE system equipped with Ga, In, Al, Si, Be effusion cells and an Arsenic cracker cell. The structures of the grown samples are presented. After initial oxide desorption, Sample 1 and Sample 2 were grown at about 585°C and 535°C, respectively. From the grown structures, devices were fabricated by using the standard photolithography procedure. Current-voltage measurements were performed at room temperature (RT). It is observed that Sample 1 which was grown at 585°C has higher efficiency and fill factor compared to Sample 2. Hence, it is concluded that the growth temperature of 585°C is more suitable to grow GaAs-based solar cells considering our samples used in this study.

Keywords : molecular beam epitaxy, solar cell, current-voltage measurement, Sun

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