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Abstract
This paper is mainly discussing two topics: to improve the method of Low Temperature Ploy-Silicon and enhance the amount of power transforming to efficiency in solar cell.
In the part of Low Temperature Ploy-Silicon.The feasibility to transform LPCVD a-Si into Poly-Si by using excimer laser annealing has been approved. More discussion and study on how to make optimization on Poly-Si are also proceeding. Excimer laser annealing (ELA) amorphous silicon (a-Si) to poly-silicon (poly-Si) in different gas environment is studied, i.e. N2 or N2 mixed O2:2%, Influence of laser power on the surface morphology, grain size and height of gibbous grain is investigated. The variation of threshold laser power for the generation of surface ablation in N2 and N2:98% mixed O2:2% environment is also discussed. From experiment, it is found that the combination of O2:2% enhance the threshold laser power for the generation of surface ablation from 320mJ/cm2 to 390mJ/cm2. In the condition of average grain over 0.25um, the process window is 30mJ/cm2 for N2, but is 50mJ/cm2 for N2 mixed O2:2% environment.
In the part of improve the power conversion efficiency of solar energy by using the reflection character of grating. Under normal sunlight, light albedo of silicon surface falls between 30% ~ 35%, we can improve the battery power for solar energy by using 30%~35% reflection light. Therefore, the study of this thesis is to use high polymer diffraction grating mold on solar plates by coating with a layer of 212.24 nm depth , 0.52μm circle and grating of 5.9% albedo used for improve the light receiving of solar battery and further enhance the power conversion efficiency.
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