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The role of annealing in properties of silicon films deposited on silicon wafer

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This paper studies the structural and optical properties of the crystalline silicon films by electron beam physical vapor deposition (EBPVD) have been applied on a silicon wafer. These films initially amorphous structure and then crystalline by heating to give a crystalline solid phase. To create heat from tube furnace annealing under an inert gas atmosphere was used at different temperatures. Optical properties of films formed by optical spectrometry technology in a visible range of the electromagnetic spectrum were performed then micro-structure of the film parameters was analyzed and the relationship between the composition of the crystalline/amorphous, grain size and characteristics of the films were analyzed. The results show an increase in light absorption with increasing annealing temperature because of the increase in structural density in these conditions. Also, results of Micro-Raman and GIXRD spectrum showed that formation and increase the number of silicon nanocrystals in the annealed condition and also by increasing the thickness of the coating due to structural defects.

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