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Nano crystal silicon growth under electron irradiation

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In our experiment, it was observed that silicon nanocrystals rapidly grow with irradiation of electron beam on amorphous silicon film prepared by pulsed laser deposition (PLD) and silicon nano crystals almost occur in spherical shape on smaller nanocrystals with less irradiation time of electron beam. It is very interesting that magical electron affection promotes growth of nanocrystals due to nano scale characteristics of electronic de Broglie wave which produces resonance to transfer energy to atoms. In the process, it was investigated that condensed structures of silicon nanocrystals are changed with different impurity atoms in silicon film, of which localized states emissions was observed. Through electron beam irradiation for 15 min on amorphous Si film doped with oxygen impurity atoms by PLD process, enhanced photoluminescence emission peaks are observed in visible light and electroluminescence emission is manipulated into the optical communication window on the bigger Si-Yb-Er nanocrystals after irradiation of electron beam for 30min.

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