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Enhanced Optical Properties of Au Nanoparticles/ZnO Nanowires Fabiracted by X-ray Induced Wet Process

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Metal nano-crystals have been received much attentions owing to their excellent catalytic property and surface plasmon effect. In the last decade, many studies on synthesizing well-dispersive nanoparticles and on understanding their distinct physical properties have been performed. There were tremendous reports revealing the electrochemical activities and enhancement of surface plasmonic effect were dependent mainly on the size, shape, and composition. So far, most fabrication methods have been based on vacuum based deposition techniques, such as chemical vapor deposition and electron-beam evaporation, and then annealed them to transform into the nanoparticles. Recently, there were several reports regarding to the photoinduced nano-crystal synthesis as an effective way to produce the metal nanoparticles. In this study, we report synchrotron x-ray mediated synthesis of Au nanoparticles on ZnO nanowires. ZnO nanowires were fabricated by hydrothermal method, and then they were dip into a solution having Au clusters. Detailed structural evolution of Au nanoparticles was investigated using scanning electron microscopy and photoluminescence measurements. The results on formation of well-dispersive Au nanoparticles on ZnO nanowires will be presented.

Keywords: X-ray induced wet process, Au nanoparticle, ZnO nanowire, surface plasmon

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Application of Buffer Layers for Back Contact in CdTe Thin Film Solar Cells

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The high contact resistance is still one of the major issues to be resolved in CdS/CdTe thin film solar cells. CdTe/Metal Schottky contact induced a high contact resistance in CdS/CdTe solar cells. It has been reported that the work function of CdTe thin film is more than 5.7 eV. There has not been a suitable back contact metal, because CdTe thin film has a high work function. In a few decades, some buffer layer was reported to improve a back contact problem. Buffer layers which are Te, Sb_2Te_3, Cu_2Te, ZnTe:Cu and so on was inserted between CdTe and metal electrode. A formed buffer layers made a tunnel junction. Hole carriers which was excited in CdTe film by light absorption was transported from CdTe to back metal electrode. In this report, we reported the variation of solar cell performance with different buffer layer at the back contact of CdTe thin film solar cell.

Keywords: CdTe, solar cell, back contact, buffer layer