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Synthesis and Characterization of ZnO/polymer planar heterojunction solar cells LEANDRO GUTIERREZ, WILLIAM MANNERS, ARYA NABIZADEH, PATRICK ALBERS, JESUS DURAN, ANTHONY SCUDIERI, ANNE ISAH, MICHAEL MCDOUGALL, MEHMET SAHINER, WEINING WANG, Seton Hall University — ZnO/polymer heterojunction has been studied by many groups for its potential application in solar cell, LED, UV photodetection and other applications. However, there are few studies on ZnO/polymer heterojunction by synthesizing ZnO using pulsed laser deposition (PLD). Comparing with other methods, PLD has the advantage of congruent evaporation, and being able to grow high quality thin films at relatively low temperature. In our previous work in pulsed-laser-deposited (PLD) ZnO/PEDOT:PSS heterojunction, correlations between the annealing conditions of pulsed laser deposition and the electrical performance of solar cells have been observed. In this work, we report two new studies: 1) Studies on how the performance of the PLD-ZnO /PEDOT:PSS heterojunction depends on polymer conductivity; 2) Comparison studies on PLD-ZnO/PEDOT:PSS and PLD-ZnO/P3HT heterojunction. We studied how the performance of ZnO/polymer solar cells depend on the polymer work function and conductivities and deposition condition of ZnO. X-ray diffraction (XRD) and scanning electron microscopy were used to characterize the PLD-ZnO film. The correlation between the solar cell electrical performance and the polymer conductivity and pulsed laser deposition conditions will be discussed.

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