Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Photoresistance of $Li_{0.2}Zn_{0.8}O$ thin films and $Li_{0.2}Zn_{0.8}O/Al_{0.15}Zn_{0.85}O$ multilayers TIANJING LI, RENZHONG DU, Department of Physics, The Pennsylvania State University, University Park, Pennsylvania 16802, USA, GONGPING LI, School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China, QI LI, Department of Physics, The Pennsylvania State University, University Park, Pennsylvania 16802, USA — Thin films of $Li_{0.2}Zn_{0.8}O$ and $Li_{0.2}Zn_{0.8}O/Al_{0.15}Zn_{0.85}O$ multilayers have been grown on sapphire substrates by pulsed-laser deposition. P-type $Li_{0.2}Zn_{0.8}O$ is an insulator with the band gap of 3.26eV and n-type $Al_{0.15}Zn_{0.85}O$ is a transparent conductor. Under the ultraviolet light irradiation, the $Li_{0.2}Zn_{0.8}O$ films show photoresistance (PR) (PR=$(R_{dark}-R_{irradiation})/R_{irradiation}$) effect of ∼340% at room temperature. In bilayers of $Li_{0.2}Zn_{0.8}O$(∼110nm)/$Al_{0.15}Zn_{0.85}O$(∼90nm) where a p-n junction is formed, the photoresistance increases to ∼8600%. The photoresistance dependence on wavelength (300-700nm) measurement shows that the photoresistance effect is observed when the light wavelength is below ∼380nm. The dependence of the light intensity and the response time of the resistance switching have also been measured and will be discussed. The largely enhanced PR effect in bilayers is probably due to the enhancement of the PR effect in p-n junctions. The increased photosensitivity indicates that the $Li_{0.2}Zn_{0.8}O/Al_{0.15}Zn_{0.85}O$ multilayers are promising for UV photodetection applications.

Tianjing Li
Department of Physics, The Pennsylvania State University,
University Park, Pennsylvania 16802, USA

Date submitted: 12 Dec 2011 Electronic form version 1.4