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Development of ZnO/Cu Nanolaminate Materials SETH KING, LORALEE BILKE, JOSEPH KRUEGER, BENJAMIN OLESON, IAN SMITH, BENJAMIN STUROMSKI, University of Wisconsin - La Crosse — Promising materials to replace cost inhibitive indium-tin oxide as transparent conductive oxide layers are ZnO based alloys. Unlike In, Zn is cheap and abundant with a stable supply. Furthermore, ZnO is easily fabricated using standard industrial scale techniques. Therefore, the development of ZnO based materials may greatly advance modern electrical devices. The undoped bandgap of ZnO is 3.4 eV, and may be degenerately doped with donor species such as Al, B, or Ga. For pure ZnO, the electron mobility is ca. 200 cm^2/V, but decreases significantly with doping due to impurity scattering. Recent studies have suggested that bilayers of doped ZnO and metal may offer low enough resistivity for industrial application. Therefore, it is a logical extension to investigate the properties of ZnO/metal nanolaminate films fabricated from multiple, thin, alternating layers of doped ZnO and a metal. We will present the preliminary results of the development of ZnO based nanolaminate materials consisting of alternating layers of ZnO and Cu fabricated by reactive DC sputter deposition. Our preliminary results suggest that these materials may have applications in photovoltaic devices as well as infrared mirrors.

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