Iodide Effect on the Conduction Band Edge of ZnO Nanomaterials

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In this project, the effect of iodide (I^-) on the conduction band edge of ZnO nanoparticles (NPs) and nanowires (NWs) has been studied. Conduction band edge was determined by measuring the flat band potential (E_{fb}) in acetonitrile using the photocurrent onset method in the presence of I^- as well as in the absence of I^- in the electrolyte. As shown in Figure 1, the presence of I^- in the system shows a shift in the E_{fb} of ZnO nanoparticles to higher energy which is indicative of I^- strongly adsorbed on ZnO surface. We study the effect of the structure of ZnO NWs and NPs; both are synthesized by the hydrothermal method. In particular, we study the effect of the mixed-terminated non-polar equivalent planes of ZnO NWs and compare them with NP films. Further, our focus of study is to understand the effect of I^- on ZnO nanomaterials for their application in solar energy devices like in the dye sensitized solar cells (DSSC).

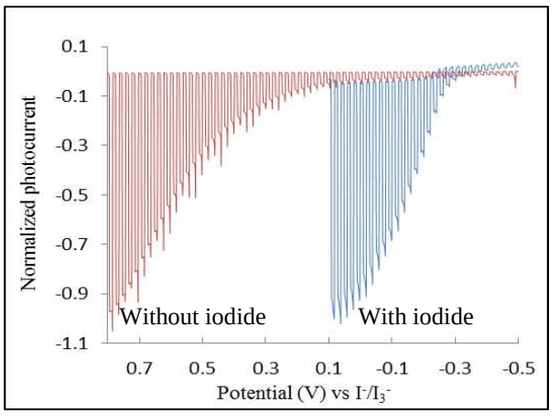

Figure 1. Photoelectrochemical measurement of the flat band potential of ZnO NP film. The reference electrode is Pt wire immersed in 10 mM iodide/tri-iodide solution in acetonitrile.