Poster Presentation

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Phase control of 2-dimensional bismuth based oxyhalide and hallide

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Development of bismuth halides and bismuth oxyhalides (BiOI/BiI3) with contemporary design appears to be proficient inputs in semiconductor research for advance photo-catalytic and photovoltaic applications. A simple and facile solution based synthesis of BiOI, BiI3 at room temperature in ambient conditions resulted with well-defined layered structures. The X-ray diffraction analysis of final product synthesized with varying concentrations of Bi3+ and I- revealed transformation of phase from BiOI to BiI3. The desirable phase and morphology of BiI3 or BiOI or mixture of both the phase can be obtained by controlling the reaction conditions. The 2D square sheets of BiOI were formed in solution due to the columbic attractions between anions (I-) and cations (Bi2O2)2+ present in acidic medium with (001) and (110) facets. The tuning of layer like structures from sheet to hexagon was achieved by varying concentration. In the intermediate state, the growth of BiI3 hexagonal plates on the surface of BiOI square sheet was observed from FESEM images. Pure BiI3 shows large number of 2-D growth of hexagonal plates. BiI3, BiOI, and BiOI- BiI3 phases are identified and analyzed by XRD and FESEM and found to have good optical response which established the potential application of these materials in photovoltaics devices.

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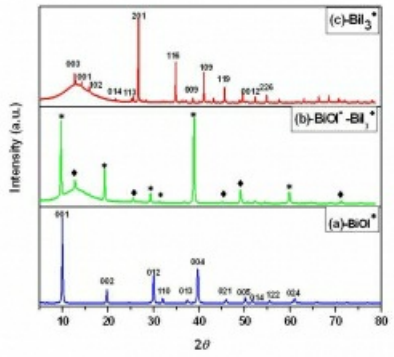

Figure1. XRD patterns of the as-prepared BiOI-BiI_3 (a) BiOI of pure phase,(b) BioI and BiI_3 of mixing phase and (c) BiI3 of pure phase

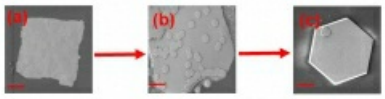

Figure2. FESEM images of the BiOI-BiI_3 products: (a) BiOI of 2D micro-sheet, (b) BiOI to BiI_3 mixing phase and (c) BiI_3 of hexagonal plate.

Keywords: Bismuth halides, photo-catalytic, photovoltaic