Abstract Submitted
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Fabrication of ZnO Nanostructure Based Polyvinylidene Fluoride Nanocomposites for Energy Application[1] SARAH PAK, BRIGHAM MU, ANTHONY MAYO, Fisk Univ, JENNIFER JONES, Vanderbilt University, RICHARD MU, EUGENE COLLINS, Fisk Univ — Zero- and one- dimensional nanostructures process many unique physical and chemical properties. With the advanced nanotechnology and computational capability, it is now possible to produce artificial and sophisticated nanostructures and systems beyond what nature can provide. The structure-by-design with bottom-up approach is expected to be the game changer but requires technological breakthroughs in many fronts. ZnO nanoparticles (NPs) and nanowires (NWs) have shown to have a broad applications ranging from optoelectronic, piezotronic, chemical and sensing. Polyvinylidene fluoride (PVDF) is another example of widely used functional crystalline polymers. It is chemical inert, optically transparent, flexible, and ferroelectric. PVDF has four crystalline structures highly dependent on the processing procedures, history, and interactions at molecular level when multicomponent composites are fabricated. Thus, the combined ZnO and PVDF composite may have the potential in ferro-, piezo- and opto-tronic applications. Our preliminary research of ZnO + PVDF nanocomposite has shown a huge optical emission enhancement when ZnO nanostructures are confined in composite form. It is very stable under different environments protected by PVDF matrix. The presentation includes structural and optical characterization, and piezoelectric testing.

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