

XANES BASED QUANTITATIVE PHASE ANALYSIS IN $\text{Cu}_2\text{ZnSnS}_4$

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Copper zinc tin sulfide (CZTS) is a direct band gap semiconductor suited for use in thin film photovoltaics. Low toxicity and the natural abundance of raw materials make it particularly attractive. However, it is a difficult material to characterize. A common phase impurity, ZnS, has a diffraction pattern that overlaps with that of the desired CZTS kesterite phase. Variable stoichiometry and the potential for small crystalline domains add to the difficulty of characterizing this material using x-ray or neutron diffraction. We have developed a strategy using x-ray absorption near edge structure (XANES) fingerprinting as a tool for quantitative phase speciation in this system, which overcomes these obstacles.