

ABSTRACT

Reaction Pathways in Processing Photons and Students

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The simple diode is the solid state device responsible for both the solar cell and light emitting diode (LED). This presentation overviews reaction pathways in the synthesis of PV absorbers as well as the deposition of the active layer in GaN-based LEDs.

Advances in the performance of $\text{Cu}(\text{In}_x\text{Ga}_{1-x})\text{Se}_2$ (CIGS) solar cells have made this material system a developing second generation thin film technology. The processes that convert precursor films to efficient absorber layers, however, are not fully understood. A review of our efforts to establish equilibrium phase relations and synthesis kinetics for this system will be given.

High brightness GaN-based LEDs emitting in the blue and near-UV are the basis for the solid state lighting industry. The large lattice and thermal mismatches between GaN and sapphire have motivated the investigation of alternative substrates. This presentation will highlight our work on the homogeneous decomposition mechanism of reactants that occurs during MOCVD of GaN as well as the growth of GaN on Si.

As part of the NSF-funded SUCCEED Engineering Education Coalition, a longitudinal database was developed that contains undergraduate student records since 1987 at nine southeastern universities. This database contains information on an extremely large number of students, and thus provides analysis of engineering student pathways with statistical significance.