Production of precursors for micro-concentrator solar cells using femtosecond LIFT

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Introduction

Copper-indium-gallium-diselenide (CIGSe) is a highly efficient thin film solar absorber material. Micro-concentrator solar cells can achieve indium saving along with increased conversion efficiencies. Laser-induced forward transfer (LIFT) for the bottom-up production of copper-indium precursor islands on a molybdenum-coated glass substrate (solar cell’s back contact).

Experimental

Set-up allows LIFT of CIGSe basis materials (Cu, In) in desired size and geometry matching the dimensions of micro-lens arrays for micro-concentrator solar cell applications.

LIFT Results

Characterization of LIFT-processed samples by optical microscopy (OM), scanning electron microscopy (SEM), and energy dispersive X-ray analyses (EDX).

Conclusions

CIGSe materials copper and indium are suitable for femtosecond LIFT, favorably transferred using a combined copper/indium donor layer. The donor layer thickness significantly influences the quality of the LIFT deposit. EDX maps of the acceptor side prove that all materials were transferred successfully, while carbonization and oxidation are kept at a minimum.

References


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