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Solution-based synthesis of crystalline silicon thin films from liquid silane inks GANJIGUNTE R.S. IYER, GURUVENKET S., JUSTIN M. HOEY, KENNETH J. ANDERSON, DOUGLAS L. SCHULZ, ORVEN F. SWENSON, S. ELANGOVAN, P. BOUDJOUK, ERIK K. HOBBIE, North Dakota State University — Silicon (Si) dominates the photovoltaics industry and there is a need for new approaches that can significantly reduce fabrication cost. In this context, we report a non-vacuum, solution-based process for the synthesis of crystalline silicon (c-Si) thin films from liquid cyclohexasilane (CHS) in a platform that is readily applicable to large-area flexible devices. UV-polymerization during spin coating leads to the formation of thin films, which were crystallized via thermal and laser annealing. Structural changes in the films were examined using SEM, AFM and Raman spectroscopy. Subsequent chemical annealing through atmospheric-pressure hydrogen plasma treatment led to a four-decade enhancement in film conductivity, which we attribute to a disorder-order transition in a bonded Si network.

Prefer Oral Session
 Prefer Poster Session

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