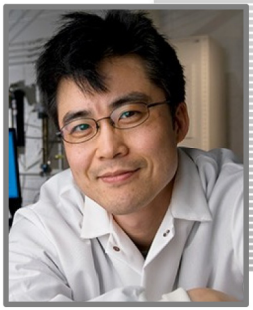
On Discontinuous Phase Transitions in Condensed and Confined Systems; some fundamental insights gleaned from studying laser annealing of Si films for AMOLED displays



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Prof. Im received a B.S. with Distinction in Materials Science and Engineering from Cornell University in 1984, and a Ph.D. in Electronic Materials from the Massachusetts Institute of Technology in 1989. Im served as a postdoctoral research fellow in Applied Physics at California Institute of Technology (Caltech) for two years before joining Columbia University engineering faculty in 1991.

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On Discontinuous Phase Transitions in Condensed and Confined Systems; some fundamental insights gleaned from studying laser annealing of Si films for AMOLED displays

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Melting of elemental solids can be identified and appreciated as a particularly simple example of discontinuous phase transitions involving condensed phases. Motivated, on the one hand, by the technological need to improve the microstructural quality of laser-crystallized columnar-grained polycrystalline Si films for manufacturing advanced AMOLED displays, as well as an opportunity, on the other hand, to investigate the fundamental details associated with phase transformations transpiring in condensed systems, we are in the process of conceptually, experimentally, and theoretically examining (particularly the initial phase of) melting and solidification in thin films with various simple polycrystalline microstructures. Preliminary results from our work, which includes an interface-curvature analysis of the system undergoing melt initiation and propagation, indicate that there are a number of overlooked or unrecognized transformation-affecting details and phenomena. We will discuss in this talk how, in fact, many of the findings are relevant and useful for understanding discontinuous phase transitions, in general, and can be particularly so for small, confined, and embedded systems that are increasingly being utilized in modern technologies.