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Metallic glue in ambient environments—Synergy of numerical simulations, analytical formulation, and experiments

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ABSTRACT

Soldering or welding can be a way of gluing solids with metals, but it requires high temperature. In microelectronics applications, the high temperature also means large thermal budget.

This talk presents a metallic glue technology that works in ambient environments – at room temperature, in air, and under finger-tip pressure. Numerical simulations are a key in the innovation of the metallic glue technology. Through a synergy of numerical simulations, analytical formulations, and experiments, a theoretical framework of nanorod growth has emerged. Through the guidance of theories, experimental realization of the smallest and well-separated nanorods has become reality. With the controlled growth of such nanorods, metallic glue becomes feasible in ambient. This technology has attracted close to 200 news reports (<http://www.mie.neu.edu/people/huang-hanchen/newsreports>) in the first few months of 2016 and is being evaluated for adoption in more than a dozen companies; see www.MesoGlue.com for further more information.