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Design of Filled One Step Chip Attach Materials (OSCA) for Conventional Mass Reflow Processing: Rheology Considerations for Jet Dispensing and Die Placement

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Abstract:

One step chip attach materials (OSCA) are dispensable polymeric materials for flip chip assembly, which are designed to flux metallic interconnections and subsequently turn into an underfill upon curing. OSCA materials enable a drastic simplification of the assembly process by combining the reflow, flux residue cleaning and capillary underfilling steps used in traditional die attach processing into a single step. A key challenge when designing filled OSCA materials for conventional mass reflow processing (OSCA-R) is to ensure that the materials have a process-friendly rheological design allowing seamless integration with jet dispensing equipment and allowing for accurate die placement. This paper presents research results and design concepts for OSCA-R materials focused on understanding the impact of filler loading, size, type and surface chemistry on rheology and the relationships with jet dispensing performance, die placement and reliability performance for test vehicles constructed with silicon and organic substrates.