

Application of Aluminum based nano-thermites for dissimilar joining of Copper to Glass

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Abstract:

Nano-thermites based on Aluminum nanoparticles generate exothermic reaction with extremely high temperature and produce liquid metal and aluminum oxide. Nanothermites are much more reactive than conventional thermites and can be ignited at 500-600°C. The purpose of this study is to show joining between products of nanothermite reaction and ceramic or glass substrate. This joining can happen using the heat generated from exothermic thermite reaction. Liquid metal is also produced in this reaction which can be used to join Cu wire to glass/ceramic substrate. Such joining has applications in micro-electronics interconnection and solar cell packaging. Thermite reaction was investigated at different temperatures in air and also in inert atmosphere. Successful joint of Cu wire to glass substrate is reported and related properties of nanothermites have been characterized such as ignition temperature and reaction energy as well as microstructure of reaction products and cross-section of the joint.

Key words:

Nano-thermite, dissimilar joining, solar cell packaging, micro-electronics,