

# Contact Resistance Stabilization for Lead Free Surfaces

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## A modified electrically conductive adhesive using innovative corrosion inhibitors such as amino acid and dicarboxylic acid

Georgia Tech inventors have developed a modified electrically conductive adhesive using innovative corrosion inhibitors such as amino acid and dicarboxylic acid. Proposed corrosion inhibitors can act as a barrier between the metal surface when forming a film over the metal surfaces, and therefore prevents the metal corrosion. The functional groups are either  $-NH_2$ , which can form bonds by electron donation, or acidic groups, such as  $-COOH$ , which can provide the proton to catalyze the epoxy resin. Furthermore, the carboxylate ion can coordinate with the Sn ion and immobilize its migration property. By forming a barrier layer or a protection film on the Sn surface, or by forming a ring closure with Sn, the contact resistance of ECA's on the Sn and Sn alloy surface can be stabilized and the reliability of ECAs can be improved significantly.

### Summary Bullets

- **Efficiency** — fuel flexibility
- **Cost effective** — single-step solution and less expensive materials
- **Lower operating temperature** — clean production of electricity

### Solution Advantages

- **Efficiency** — fuel flexibility
- **Cost effective** — single-step solution and less expensive materials
- **Lower operating temperature** — clean production of electricity
- **Improved operation** — vibration-free and virtually noise-free
- **Enhanced electro-catalytic activity** — stability of the cathode

### Potential Commercial Applications

- Production of solid oxide fuel cells
  - Power generation
  - Transportation
  - Military applications

## Background and More Information

With the phasing out of lead-bearing solders, electrically conductive adhesives (ECA's) have been identified as an environmentally friendly alternative to tin/lead (Sn/Pb) solders in electronic packaging applications. Unfortunately, unstable contact resistance on non-noble surfaces due to galvanic corrosion have been a critical issue and have prevented their wide applications.

## Inventors

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## IP Status

: US7527749B2

## Publications

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## Images



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