Advanced Packaging

Honeywell

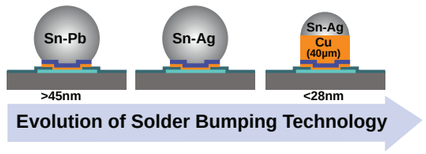
Honeywell RadLo™ Low Alpha Packaging Materials

Honeywell RadLo™ Low Alpha Materials for Advanced Packaging Solutions

Enabling High-Performance Devices

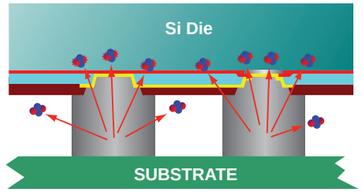
Alpha emissions from packaging materials can cause soft errors in vulnerable devices. Honeywell has developed a wide range of low alpha packaging materials to meet this challenge.

Impact of Alpha Emissions on Device Performance



Device miniaturization puts packaging materials, such as wafer bumps and Cu pillar solder caps, in proximity to critical device layers. Flip-chip devices and 3-D wafer-level chips are particularly vulnerable to alpha emissions from these packaging materials.

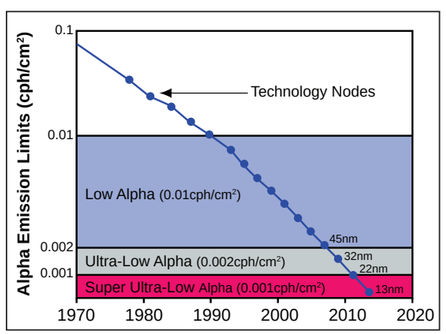
Wafer Bump Alpha Issues



Alpha Particles from Solder

Industry Needs

To Reduce Soft Errors in Devices, Packaging Materials Must:	RadLo Materials:
• Meet critical alpha emission specifications	• Reduction in alpha-emitting contaminants enables materials to meet emission specifications
• Exhibit stable alpha emission levels over time	• Metrology processes help ensure that alpha emissions from materials do not increase over time
• Be customizable and offer ease of integration	• Available in various form factors and alloys

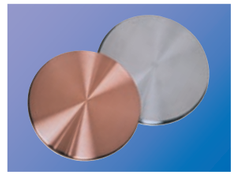


Device Miniaturization Drives Need for Lower Alpha Emissions

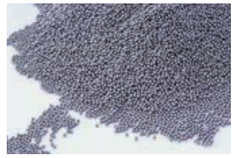
Products & Features

Honeywell's Role in Low Alpha Materials Manufacturing

HONEYWELL Materials Used In →
- Solder Pastes
- Solder Spheres
- Plating Solutions
- Plating Anodes



Honeywell RadLo™ Materials
Above: Solder Feedstock and Plating Anodes. Right: Plating Solution Materials



Product Types:

- Lead-based and lead-free solder feedstock
- Low alpha tin-based anodes for plating systems
- SnO and Sn-MSA for plating solution material

Custom Development

Honeywell's development team will partner with customers to create custom alloys.

RadLo Products are Available in 3 Alpha Grades:

- Low alpha grade (<0.01/counts/hr/cm²)
- Ultra-low alpha grade (<0.002 counts/hr/cm²)
- Super ultra-low alpha grade (<0.001counts/hr/cm²)

Our products are manufactured to meet 99.99% (4N) or higher purity.

Technology Leadership

- Advanced metrology processes based on industry-wide alpha measurement standards
- Proprietary refining techniques involving selective removal of alpha-emitting isotopes
- State-of-the-art research in alpha emitter properties and transport mechanisms supports development of next-generation products

Proven Solutions

Honeywell RadLo materials offer proven reliability in various applications. Our experience and expertise in low alpha manufacturing spans two decades.

Technical Support

We offer comprehensive technical guidance to support our customers' needs.

Honeywell Advantages

HONEYWELL RESOURCES:

- **Application Support and Qualification Information**
- **Detailed Specifications**
- **Ordering Information**

For Additional Information, Visit www.honeywell-lowalpha.com

Choose Honeywell RadLo Low Alpha Packaging Solutions

Honeywell

Honeywell RadLo™ Low Alpha Materials for Advanced Packaging Solutions

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