



**Honeywell RadLo™ Low Alpha  
Packaging Materials**

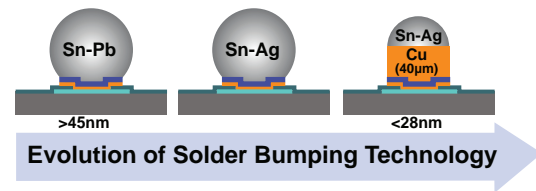
# Honeywell RadLo™ Low Alpha Materials for Advanced Packaging Solutions

## Enabling High-Performance Devices

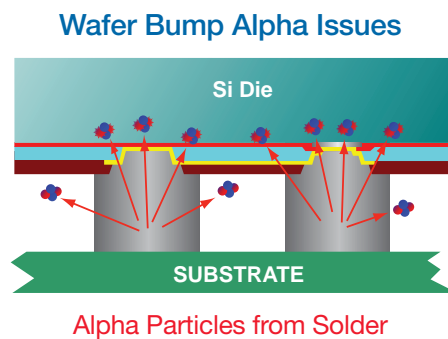
Alpha emissions from packaging materials can cause soft errors in vulnerable devices. Honeywell has developed a wide range of low alpha packaging materials to meet this challenge.



## 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.



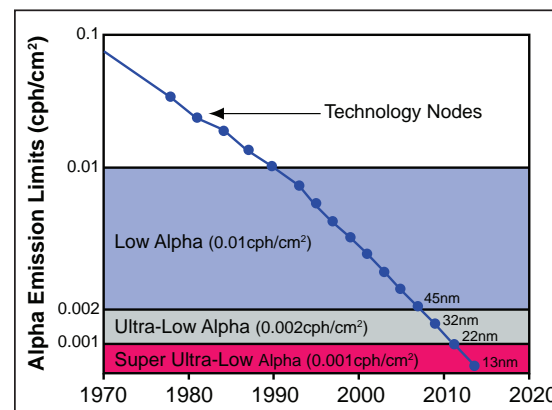
## Industry Needs

### To Reduce Soft Errors in Devices, Packaging Materials Must:

- Meet critical alpha emission specifications
- Exhibit stable alpha emission levels over time
- Be customizable and offer ease of integration

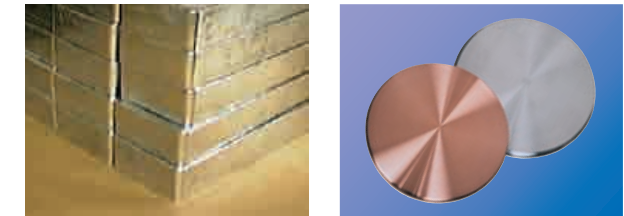
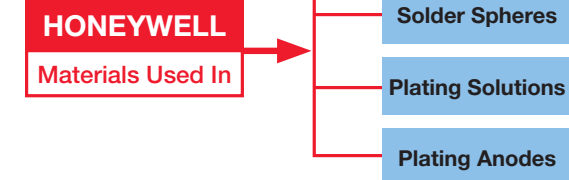
### RadLo Materials:

- Reduction in alpha-emitting contaminants enables materials to meet emission specifications
- Metrology processes help ensure that alpha emissions from materials do not increase over time
- Available in various form factors and alloys



Device Miniaturization Drives Need for Lower Alpha Emissions

## Honeywell's Role in Low Alpha Materials Manufacturing



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/cou/hrs/cm²)
- Ultra-low alpha grade (<0.002 counts/hr/cm²)
- Super ultra-low alpha grade (<0.001 counts/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.

## Products & Features

## Honeywell Advantages

## HONEYWELL RESOURCES:

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

For Additional Information, Visit [www.honeywell-lowalpha.com](http://www.honeywell-lowalpha.com)

Choose Honeywell RadLo Low Alpha Packaging Solutions



# Honeywell RadLo™ Low Alpha Materials for Advanced Packaging Solutions



**RESPONSIBLE CARE®**  
OUR COMMITMENT TO SUSTAINABILITY

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**Germany:** 49-5137-999-9199

**Japan:** 81-3-6730-7092

**Korea:** 82-2-3483-5076

**Singapore:** 65-6580-3593

**Taiwan:** 886-3-6580300 ext.312

**[www.honeywell-lowalpha.com](http://www.honeywell-lowalpha.com)**

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