

## Case study on Alpha Counting

### Alpha Counting of raw materials and finished electronic parts

#### What is Alpha Counting service?

Alpha Counting is a turnkey solution offer to the semiconductor supply chain to measure alpha emission in  $\alpha/\text{cm}^2/\text{hr}$  of any material or finished electronic parts. It is performed by experts of the field from Alpha Sciences and iRoC Technologies on special equipments that are calibrated and maintained in a controlled environment.

#### When is Alpha counting required?

Alpha Counting is required by package houses or Integrated Circuit designer to be performed by their supply chain.

Supply chain Vendors sell both Low Alpha (LA) materials and packages or Ultra Low Alpha (ULA) ones.

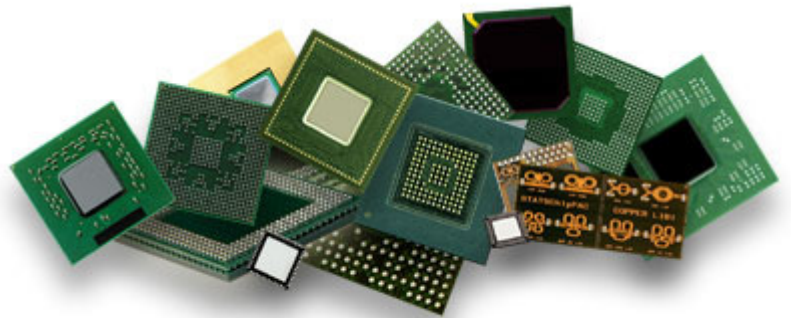
Low Alpha means that the emission rate is below  $0.1 \alpha/\text{cm}^2/\text{hr}$

Ultra Low Alpha materials produce emission rates below  $0.01 \alpha/\text{cm}^2/\text{hr}$ .

Emissions as low as  $.0001 \alpha/\text{cm}^2/\text{hr}$  can be detected.

Obviously the pricing and conditions of application of LA and ULA materials are different, making alpha measurement result an important input to both technical and economical decision.

The measurement is either part of the regular quality control procedure at the assembly house, or it can be used to verify the performance of the finished good with respect to the client specification.

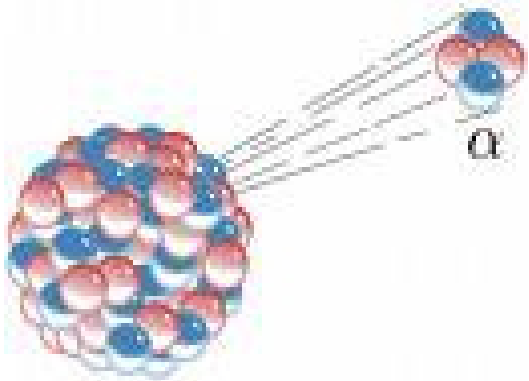


#### Why is Alpha Counting used?

Alpha counting is used to verify the level of emission of alpha particles of the different parts of the integrated circuits (wafer, finished package, materials within the package) and equipments which come in contact with the integrated circuit (holding trays, ESD bags).

Alpha particles are charged particles emitted by radioactive elements that can be found within the integrated circuit (wafer or package). Alpha particles can generate errors and malfunctions of the electronic component, throughout the life of the device. These malfunctions are called Soft Errors.

Examples of radioactive elements found in wafer and packaged materials are Uranium, Thorium, Radon, Lead and all their decay chain. It takes a very small amount of these radioactive materials (almost impossible to detect) to generate enough alpha particles for dramatic errors to occur.



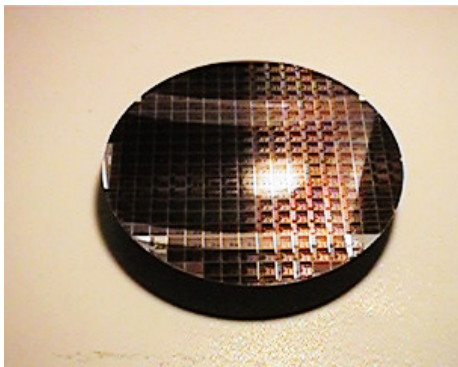
## How is Alpha Counting performed?

Alpha Counting is performed using a surface emission gas proportional counter from Alpha Sciences Inc.

You send the samples to us, and we prepare them to fit into the counter. Note that we can accommodate full 300mm wafers in the counters. Good care should be taken in that phase to avoid contamination, especially with Radon gas.

First a count of the background noise of the counter is performed, then the sample itself. Pending on the area of the sample (up to 1800cm<sup>2</sup>) and the level of alpha emission, the measurement takes two to three days.

Samples are returned to you upon request and the report is sent right after the measurement is complete. The whole measurement cycle takes about 7 days.



## Can Alpha Counting be used for special applications?

Alpha Counting is performed on many forms of samples: raw material, wafers, pellets, solder balls, powder, paste and glue, liquid. It can even be performed on finished goods like integrated circuits, trays, finished good package.

Please contact us for special cases: we will help you get the alpha count for many applications, including antique pieces of lead recover from the bottom of the ocean (Greek artifacts)!

## How can you get Alpha Counting?

You can contact us directly at [sales@iroctech.com](mailto:sales@iroctech.com) or visit our website at [http://www.iroctech.com/sol\\_test\\_115.html](http://www.iroctech.com/sol_test_115.html) in order to ask for a quote and schedule a counting service.

Let us know if there are specific handling procedures for your material (keep at low temperature, disposal procedure, hazards) and we will send you a quote for your request. You can then prepare shipment of the required quantity of your samples to either our US office (Santa Clara, CA) or our European offices (Grenoble, France). We'll give you all the needed explanations at our first contact.

Once the test is performed, you will receive a report including a measurement certificate and the history of counts by the counter hour by hour.

