

P O S I T H Ô T

**Spreading the Positron technology,
process and methodology within your organization**

Positron spectroscopy

The new industrial tool to probe the finest defects in matter

*A long-term investment for a long-term and renewed performance
on the materials, parts and processes*

**Posithôt
a CEA spin off
established 2015**

Posithôt : where industry and anti-matter collide !

Posithôt : Unité A02, 12 avenue de Norvège, 91140 Villebon sur Yvette, France

A unique tool for defects spectroscopy



Posithôt is a unique spectrometry based on the emission of positrons - the anti-particle of the electron – those species being generated in a special gun and subsequently sent onto samples to probe their finest structure. Positrons naturally tend to accumulate in defects (which are negatively charged) and this way annihilates each time they hit an electron in the voids. The resulting gamma ray emission is then recorded providing a precise profiling of the matter structure. This way cracks in metals, lattice defects in semiconductors, excluded volume in polymers as well as pores in zeolites, powders, ceramics and membranes can be probed as a function of the thickness...

Reflecting the ratio of consumption of internal bonding energy on the volume of surface, this very fundamental but also very applied cursor is now easily available on a routine and incremental way to achieve new upstream R&D but also new downstream NDT and inspection results on your various current and future applications for a safe energy transition.

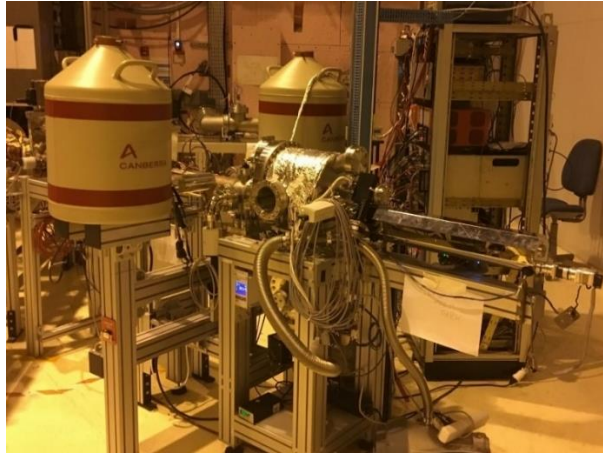
The impact of the physical and chemical environments of solicitation on the materials, parts and processes (transformations of phase) and on their functionalities either mechanical, thermal, electrical or photonic is more finely appreciated. It covers such mechanisms as fatigue, oxidation, corrosion, hydrogen permeation, radiation exposure...

Chemical catalysis, electrolysis and osmosis are also more soundly approached in this way.

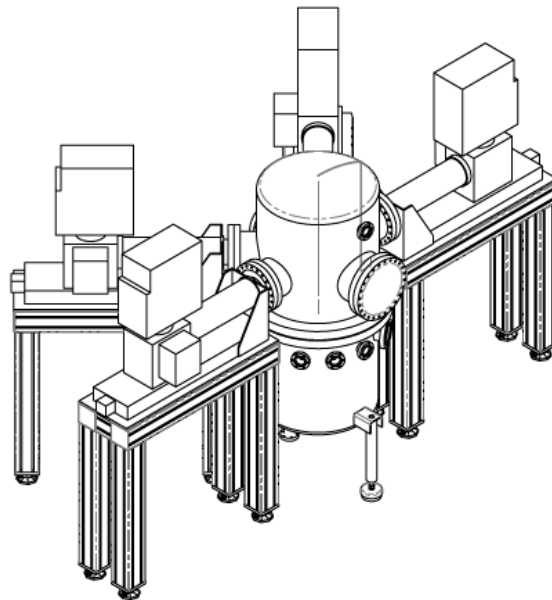
The use of a nonradioactive gun patented by Posithôt leads to an easy use and servicing of the device. This high technology is totally new to the industrial world and allow for the nondestructive control of highly priced objects ranging from engines parts and turbine blades to composite structural elements as well semiconductor wafers for electronics and photovoltaics.

Dedicated instrumentations:

- **1D coupons Checker for Materials Labs amending the others sources of analysis...**

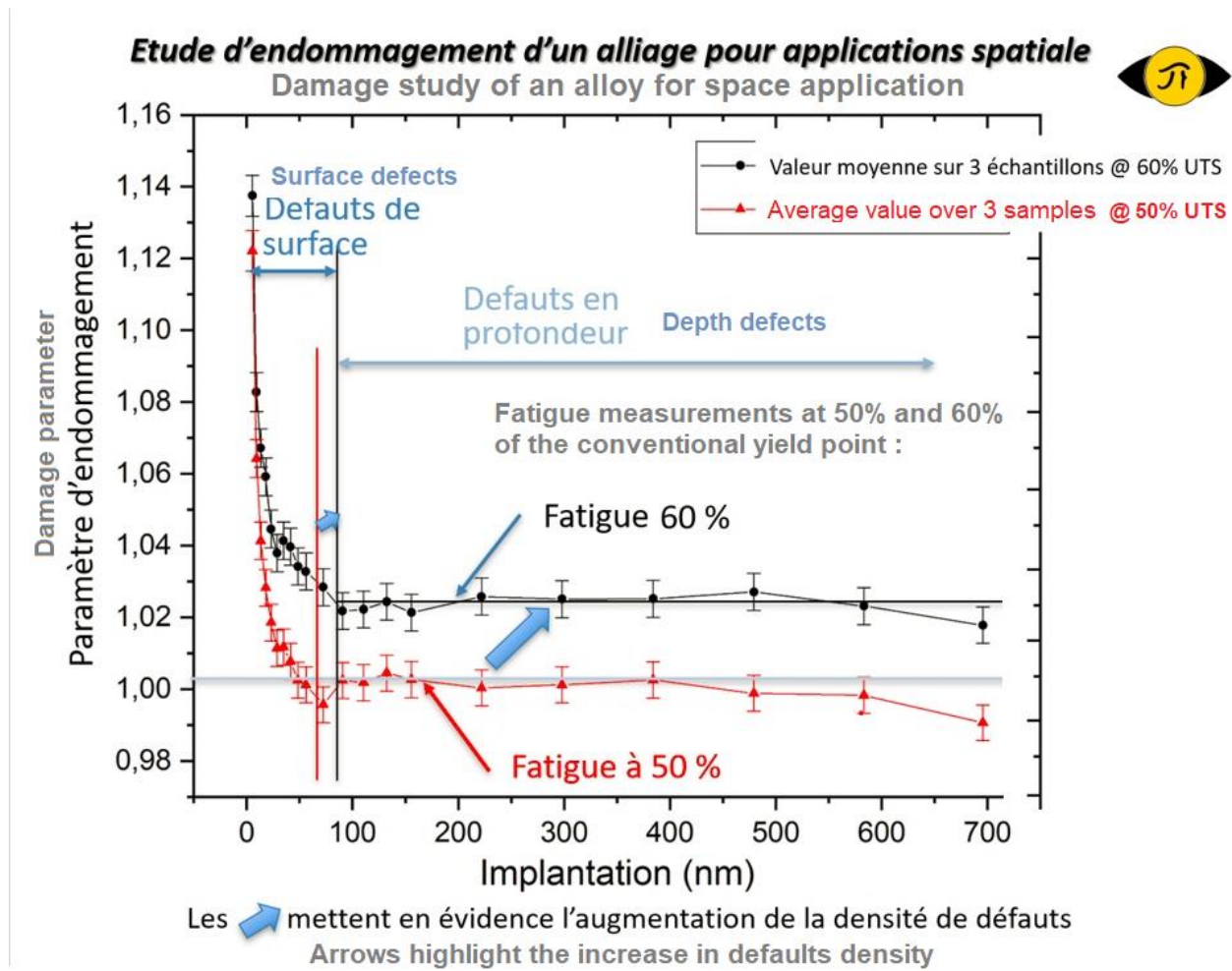


- **3D parts Checker for Prototype and Industrial NDT Processes (semiautomated)...**



- **In anticipation of Reported Controls on Stationary Elements...**

A cutting-edge equipment for defect profiling



The ability of positrons (the anti-particle of the electron) to be attracted by the defects of matter (which contain no positive nucleus at all but still bear a weak negative charge due to the remnant presence of electrons) and their ability to stay « alive » when hopping from defect to defect allow positrons to reveal the presence of defects. When finally colliding with remnant electrons in defects the gamma photons emitted are easily detected which in turn allow the recording of fine profiles of defects in matter.

The figure above shows the defect density as a function of thickness for an alloy used in a space application. In this example, the measurement is taken in the first micron of thickness, where defects appear as a result of the stresses applied, well before the appearance of cracks that lead to devastating effects.

Materials such as metals, alloys, thin layers, semiconductors, polymers, membranes, carbon-carbon, ceramics and zeolites can be addressed...

As an objectivization of the empirical Wölher curb to each sub-system, it so complements and correlates the information got with other sources of analysis as for example Electronic Scanning Microscope, Neutrons or X-Ray, etc...

A routine tool for advanced applications on your materials, parts and processes



..... New materials and composites



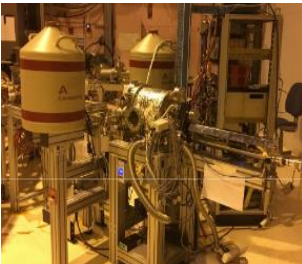
..... Safety in Aerospace and transportation



..... Nuclear and Oil Industry + New H2 Technologies



..... Electronics and portable energy storage hazards



..... New Industrial standards for quality control

A team to support your R&D effort

Ideally located in the south of Paris on the Les Ullis Technoparc, close to the Saclay-Orsay scientific area, Posithôt with its team of 6 physicists can provide you with all the support you need to pre-test your materials, support your R&D endeavour and provide you with first hand data from another world...

Putting the spotlight on ageing/damage properties eases the decisions in terms of upstream development and rapid prototyping on functional materials, parts and processes as it allows to discriminate for industrial reasons between the compositions, processes (transformations of phase) and functionalities that can be achieved. Downstream, it also eases the actions to achieve as it allows to discriminate for quality and safety reasons between the inputs to be launched, the outputs to be produced and in use the parts or tools to be replaced.

Challenging your current assumptions and practices as external porosity in its volume of surface calls internal porosity and so lack or loss of functionality and efficiency, here is the way to effectively get both leaner, less ponderous and costly, but also more efficient, versatile and reliable solutions in advance of the box. ***So please, come to us for a demonstration or a few tests on your samples to better assess your current and future achievements!***

Posithôt is where anti-matter and industry collide!



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How much does it cost?

- A Nonradioactive Generator of a steady flow of low energy of positron: 2 Me
- A Dedicated 1D Checker: 1,3 Me
- A working day of 1D and Nondestructive calibration: 10 Ke
- A Dedicated 3D Checker: 2,3 Me
- A working day of 3D and Nondestructive calibration: 20 Ke

How much will you earn?

- We can help you to make the calculations on your very specific and dedicated materials, parts and processes in their environment of sollicitation and functionality in difference with the external and internal costs, results and earnings resulting of your current practices and lead-times on these items in terms of purchases, research, design, materials lab, production, NDT and periodic maintenance...