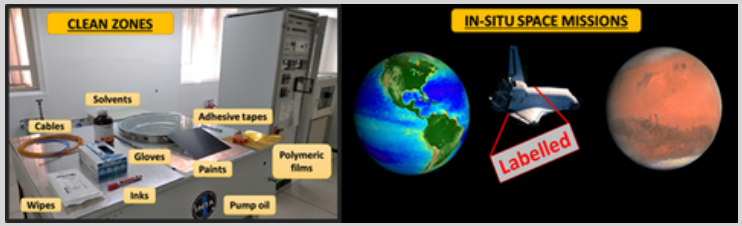
Marking of material allowing unambiguous identification of any material dissemination in the environment



MARKET NEED

- **Control of contamination of a bod**y, such as in clean rooms or space missions.
- **Discrimination of contamination sources**
- **Preventive maintenance** of, for example, medical prostheses.

CONTACT

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STAGE OF DEVELOPEMENT

- **Patented** technology.
- **Validated** and **demonstrated** for PET (**TRL 8,** space mission launch pending).
- Looking for **collaboration** for the development of a demonstrator i**n other materials and real conditions,** and subsequent **transfer**.

ISOTOPICALLY LABELED MATERIAL

The Metallic Materials Area of the National Institute for Aerospace Technology investigates the labeling of materials, by isotope incorporation strategies of natural elements, and the traceability of the diffusion of these materials in their environment.

Briefly, this technology proposes the modification of specific positions of natural elements (H, C, N, O,...) that form the polymeric chains by one of their stable isotopes (in the case of H, e.g. Deuterium).

Marking is carried out based on a strategy, developed internally at INTA, which guarantees, for each specific material, the best ratio between the amount of precursors labeled and their detectability. This technology allows the materials to be unequivocally identifiable, by means of known techniques and, therefore, any potential diffusion of the material in its environment can be traceable.

Isotopes have, a priori, the same chemical properties as their natural analogs, but with added mass in the nucleus. This increase in molecular weight, which leads to labeling, is associated with the modification of some of the physical material properties, which can be exploited for different applications.

It is important to note that the technique described does not introduce any additives into the compounds to facilitate detection. In other words, from a chemical point of view, the labeled material is exactly the same material that is found naturally.

ADVANTAGES

- Unambiguous identification of materials.
- No need for additives.
- Identifies sources of contamination in clean environments.
- Guarantees reliable measurements in controlled environments.
- Early warning of material wear.
- Economical solution.