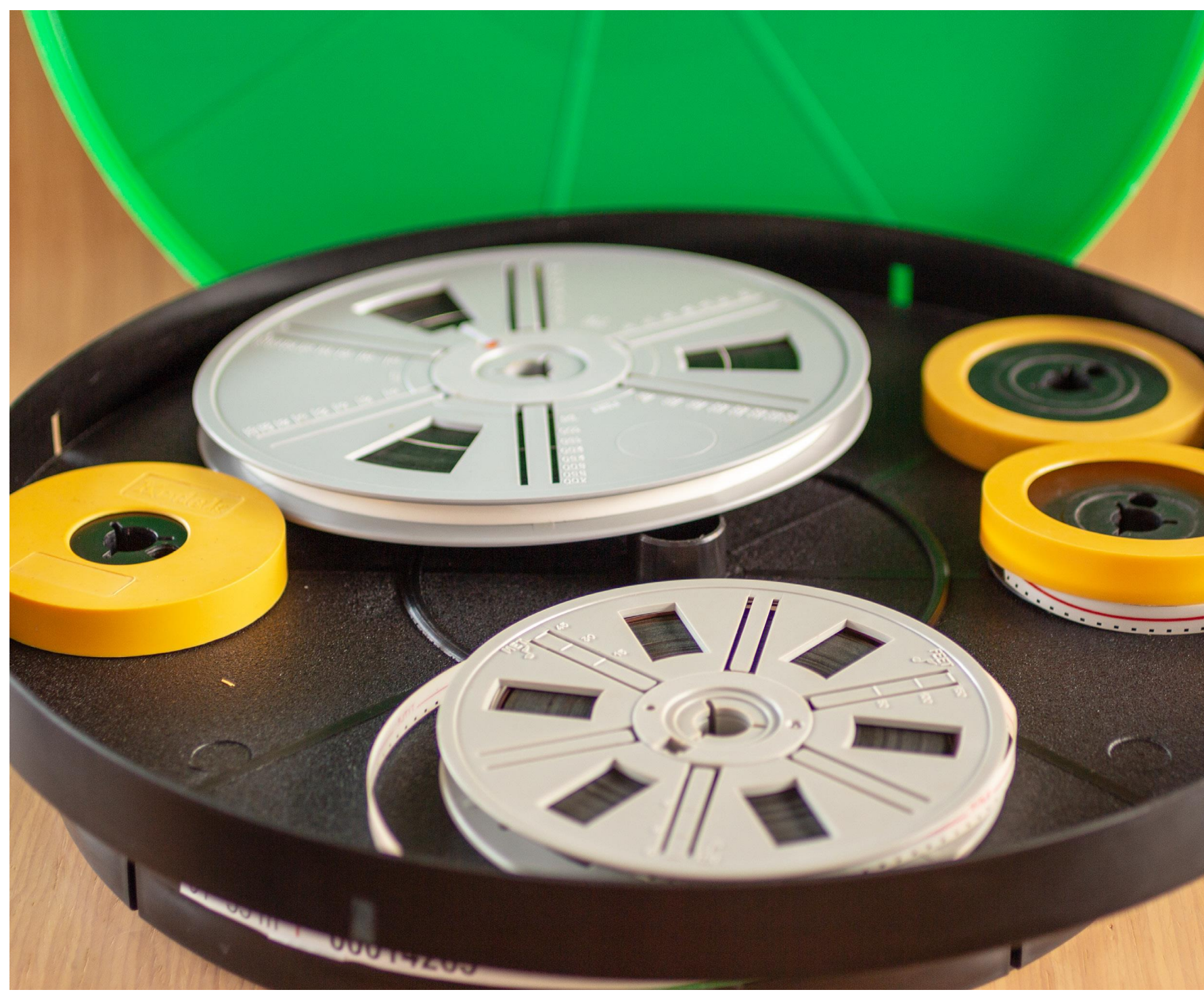
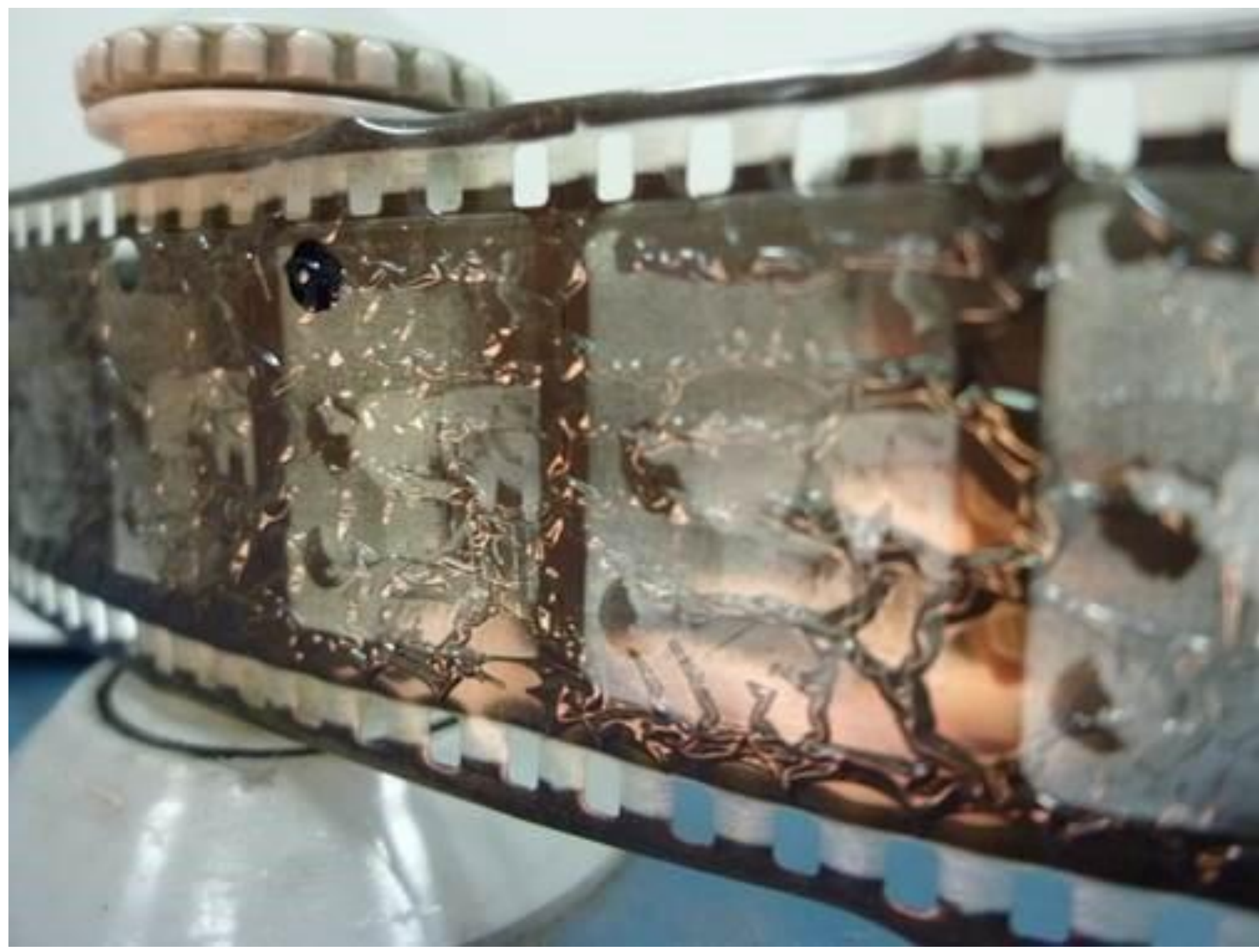


# INNOVATIVE PACKAGING SOLUTIONS FOR STORAGE AND CONSERVATION OF 20TH CENTURY CULTURAL HERITAGE OF ARTEFACTS BASED ON CELLULOSE DERIVATIVE

Ana Maria Ramos, Artur Neves, Élia Roldão, Joana Silva, Eva Marisole Angelin and Maria João Melo



A huge percentage of the European cultural heritage (CH) can be found in movies, photos and posters produced between 1895 to nowadays were made using cellulose derivatives. More than 75 years of visual and audio memories are up to now in serious danger to be lost due to the natural instability cellulose acetate (CA) and cellulose nitrate (CN) materials. Once initiated, degradation cannot be prevented, reversed or stopped, but only inhibited or slowed. Inhibitive conservation of cellulose derivatives can either involve the removal or reduction of factors causing degradation including light, oxygen, acids, fungus and relative humidity among others, as well as cost-sensitive processes such as freeze.

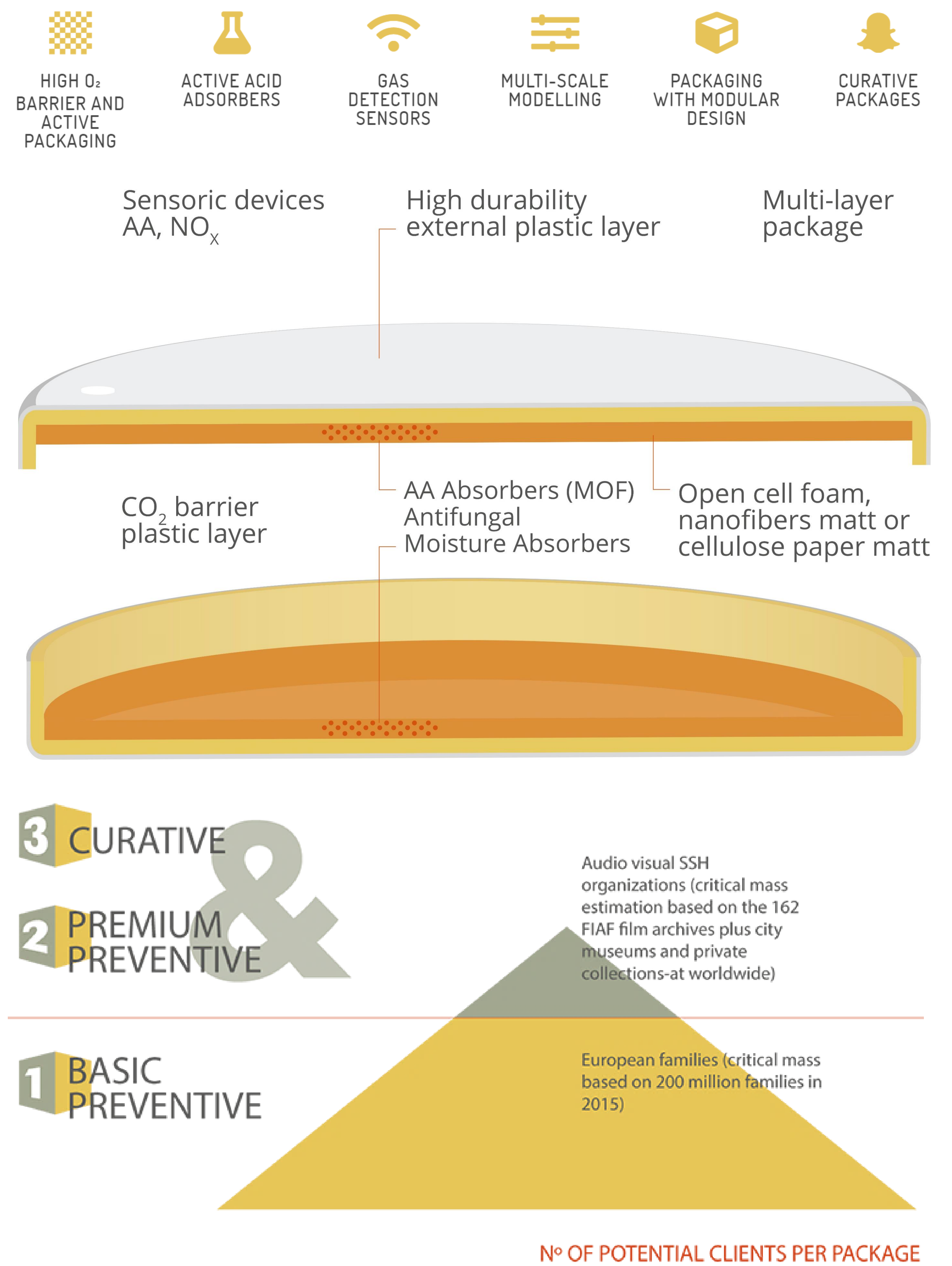
The main target of NEMOSINE project is the long term preservation of films based on cellulose derivatives, cellulose acetate and cellulose nitrate from photographic, movies and audio supports collections

## THE PROJECT

NEMOSINE improves traditional storage solutions, such as freeze storage (below 5°C), by developing an innovative package with the main goal of energy saving and extent conservation time. NEMOSINE will develop: i) high O<sub>2</sub> barrier and active packaging using non-odour additives; ii) active acid adsorbers based on functionalized Metal Organic Framework (MOFs) integrated in innovative structures; iii) gas detection sensors to monitoring AA, O<sub>2</sub> & NO<sub>x</sub>; iv) multi-scale modelling to correlate degradation & sensors signals; v) packaging with modular design to fulfil the technical & economical requirements of the different CH made by cellulose derivatives.

These innovative solutions will be shaped as three packages prototypes with different functionalities and target customers: preventive (basic & premium) and curative. Based on the same outside box possessing high barrier properties to oxygen, they differ on the devices inside: i) basic preventive package with a monitoring gas sensor; ii) premium preventive with a gas sensor and an adsorbent device; and iii) curative package with an antifungal system.

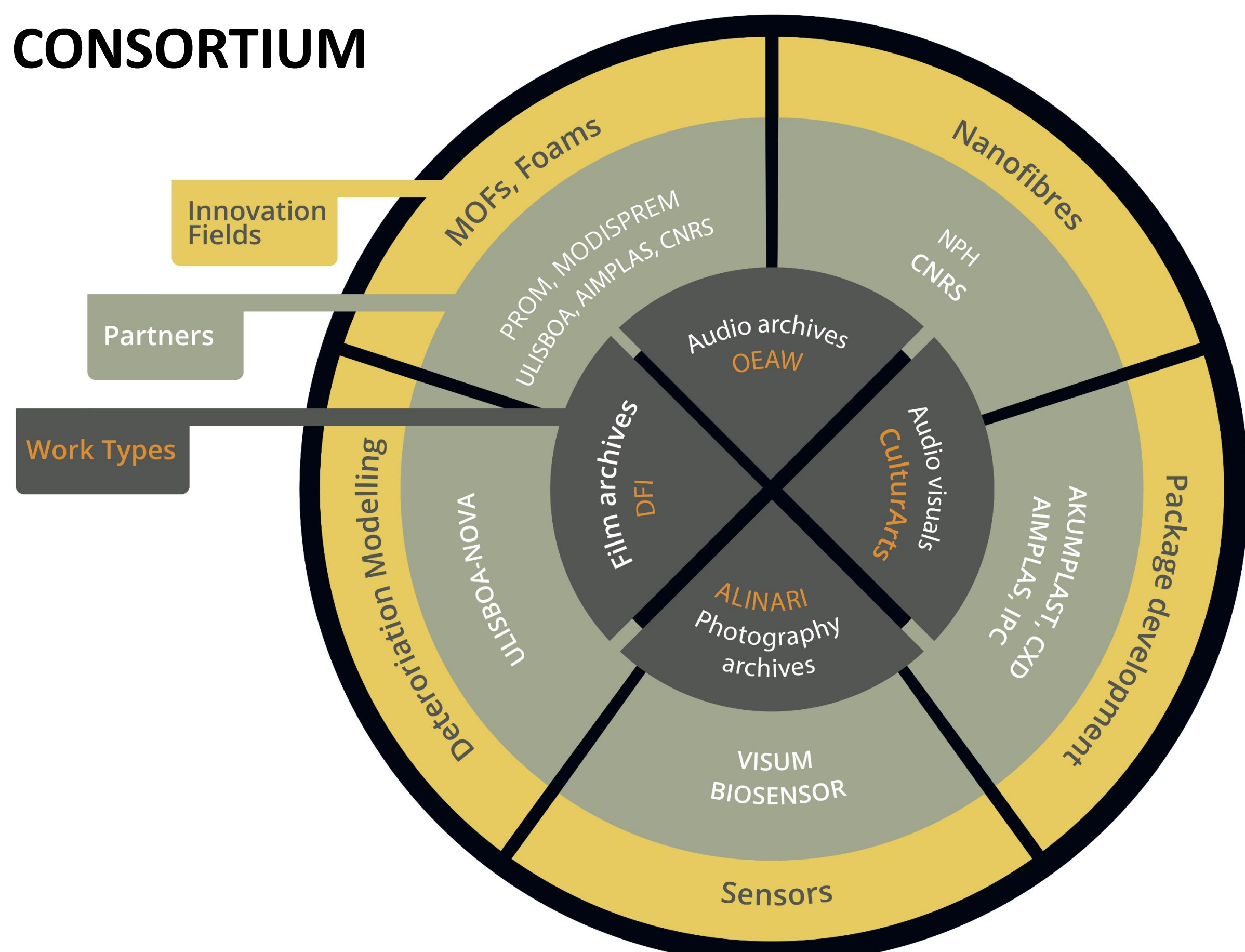
## NEMOSINE SMART PACKAGE CONCEPT



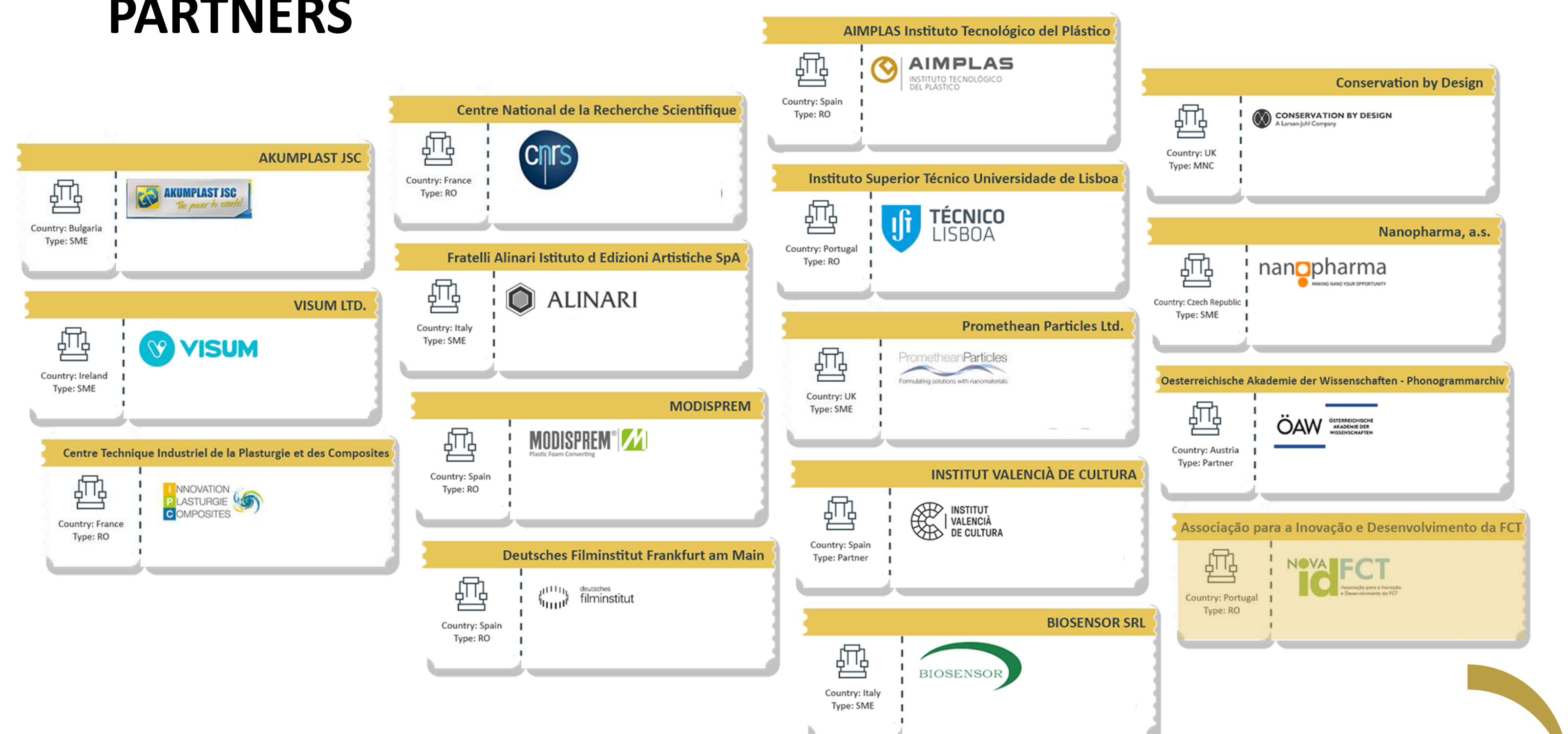
## NEMOSINE RESEARCH ROUTE



## CONSORTIUM



## PARTNERS



Nº OF POTENTIAL CLIENTS PER PACKAGE

**Research Team**  
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 Technical issues related to Life Cycle Assessment (LCA) and waste management