



## ECO-SUSTAINABLE MATERIALS AND SOLUTIONS FOR THE CONSERVATION OF CULTURAL HERITAGE

**Maria Pia Casaletto\*, Antonella Privitera, Viviana Figà**

*Istituto per lo Studio dei Materiali Nanostrutturati, ISMN-CNR, Via Ugo La Malfa 153, 90146 Palermo*

\* [mariapia.casaletto@cnr.it](mailto:mariapia.casaletto@cnr.it)



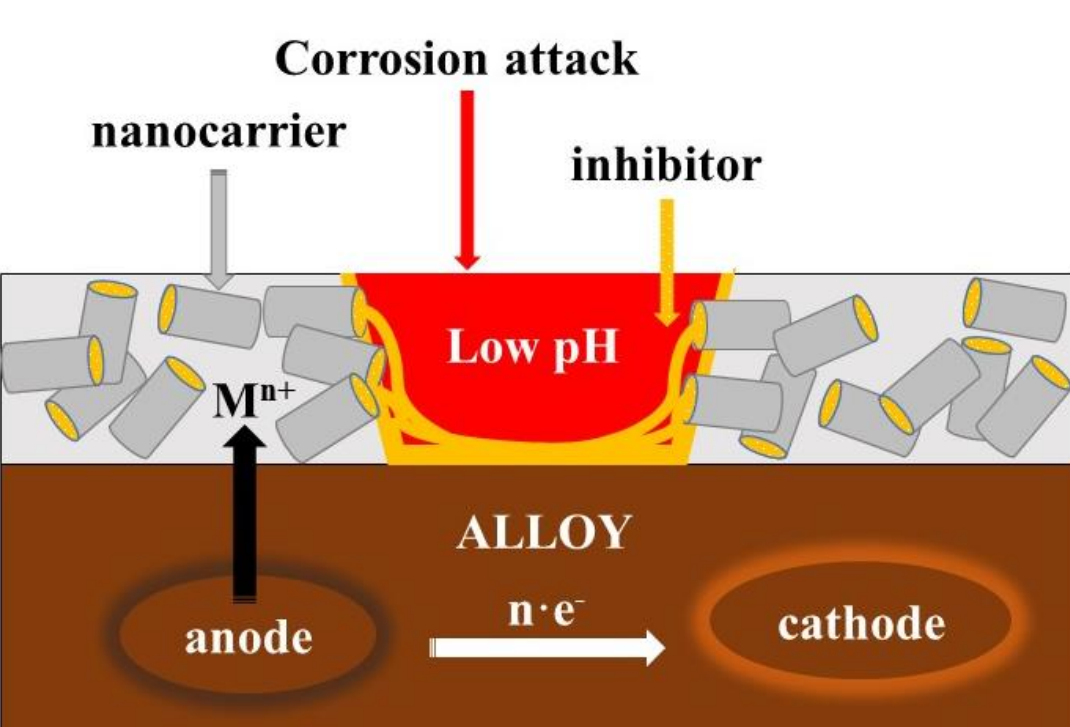
Biodeterioration of stone monuments and archaeological sites and corrosion of metallic artworks represent a critical issue for the preservation and conservation of Cultural Heritage. Unfortunately, commercial products used in traditional restoration treatments are often toxic and/or harmful, environmentally-unfriendly, easily subjected to a leaching process that could induce dispersion of the chemicals into the surroundings and reduce the protective action. The development of new materials and methods for the conservation of ancient surfaces is a necessary response to the demand for safety, not only of the Cultural Heritage to be protected, but also of the Restorer and the Environment.

### DESIGN

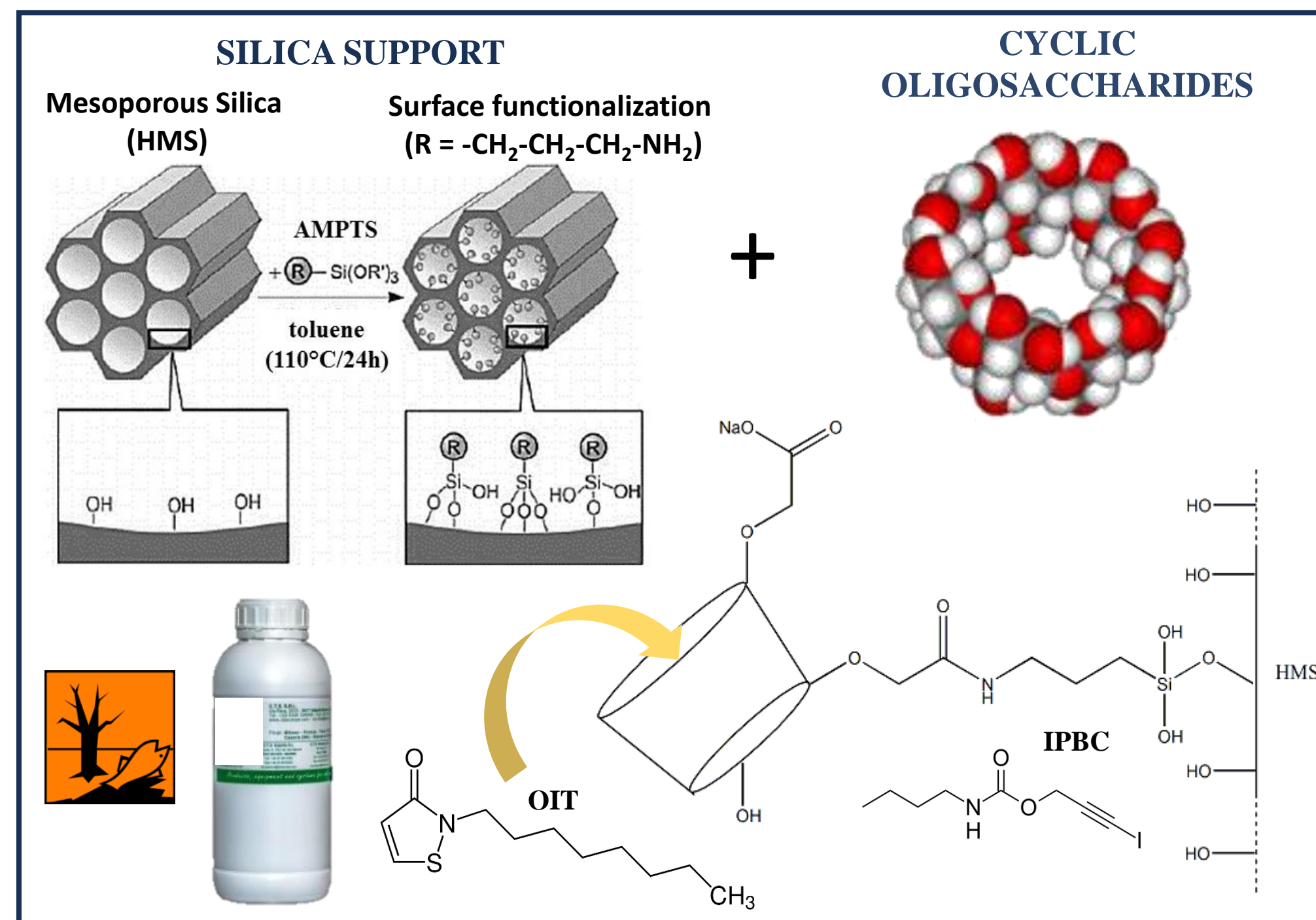
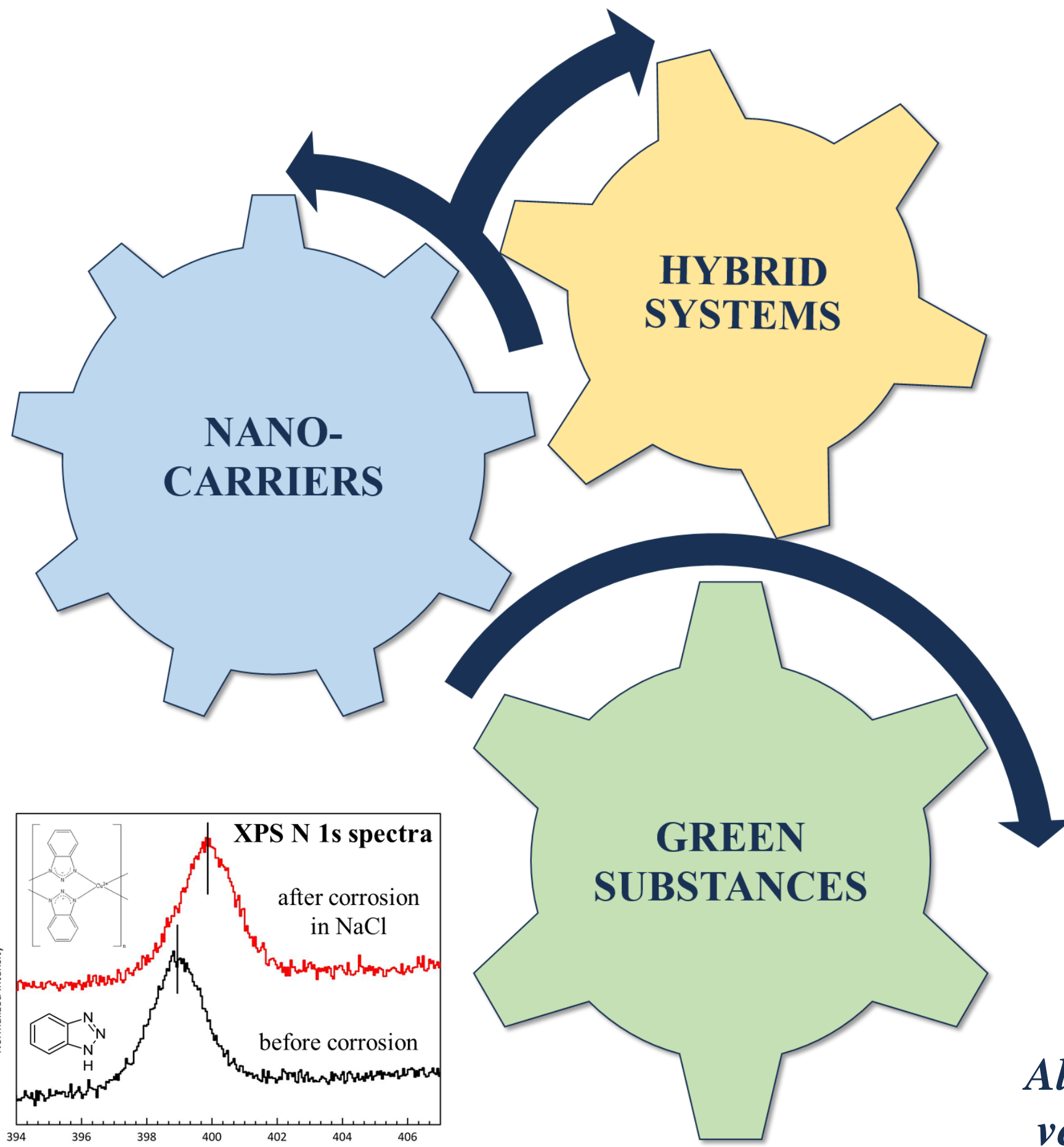
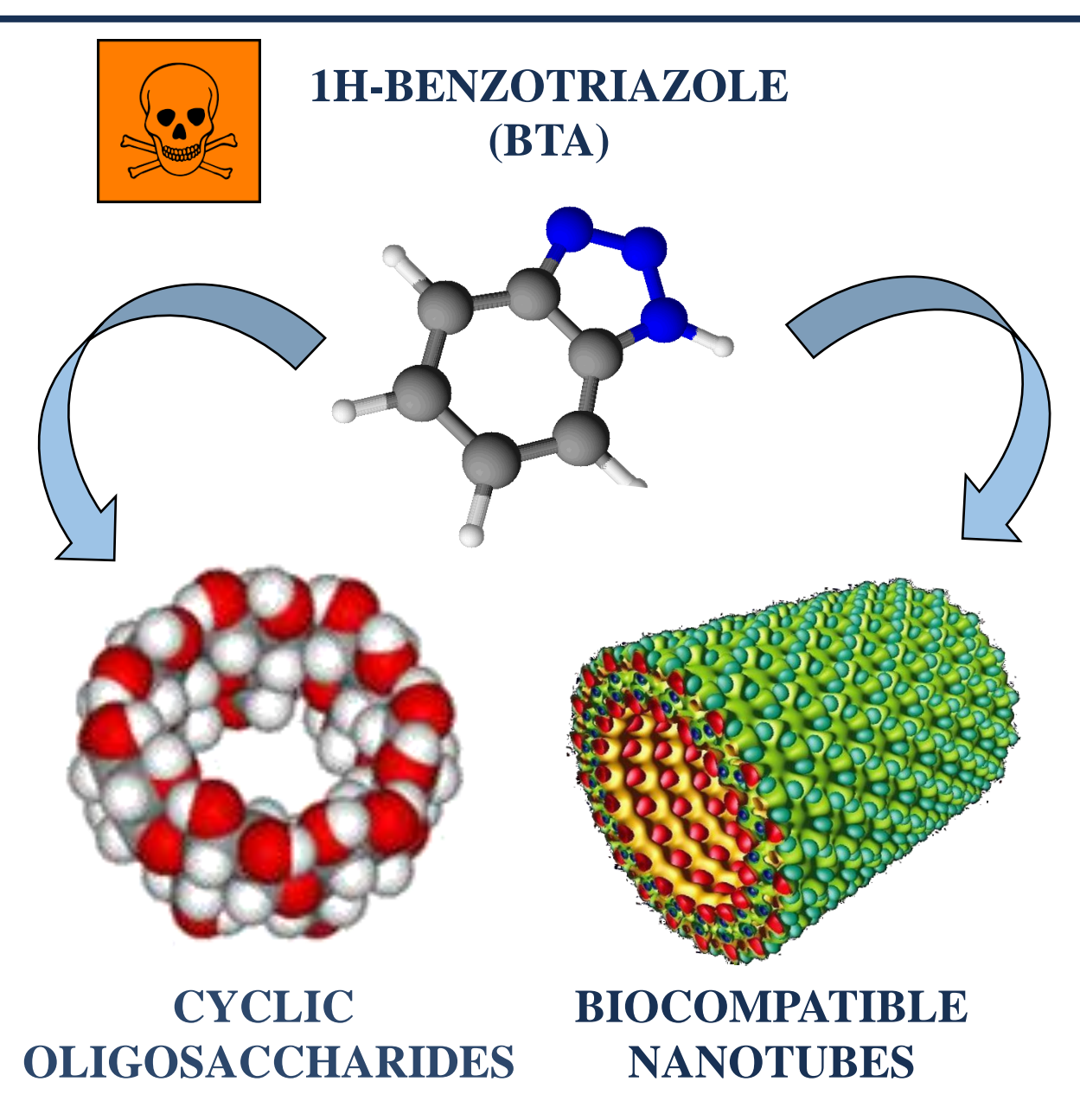
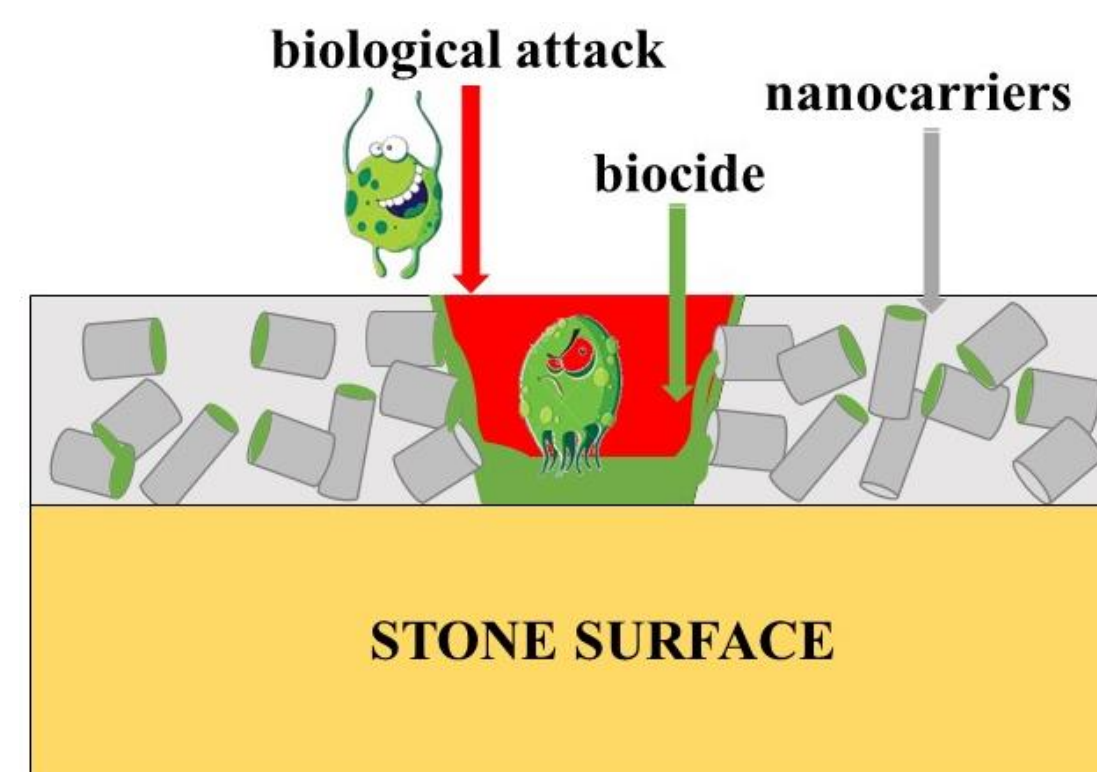
### SYNTHESIS

### DIAGNOSTICS

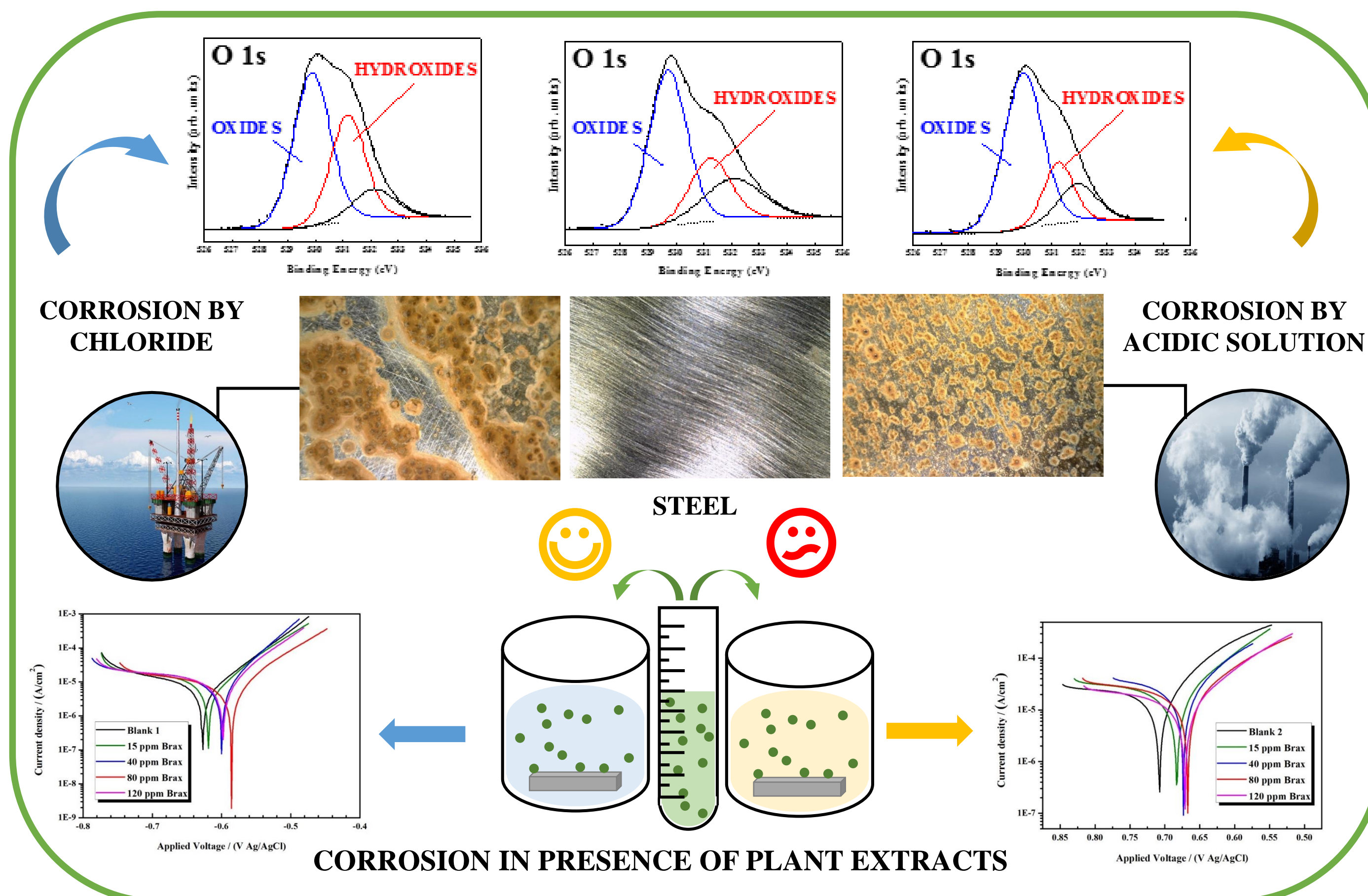
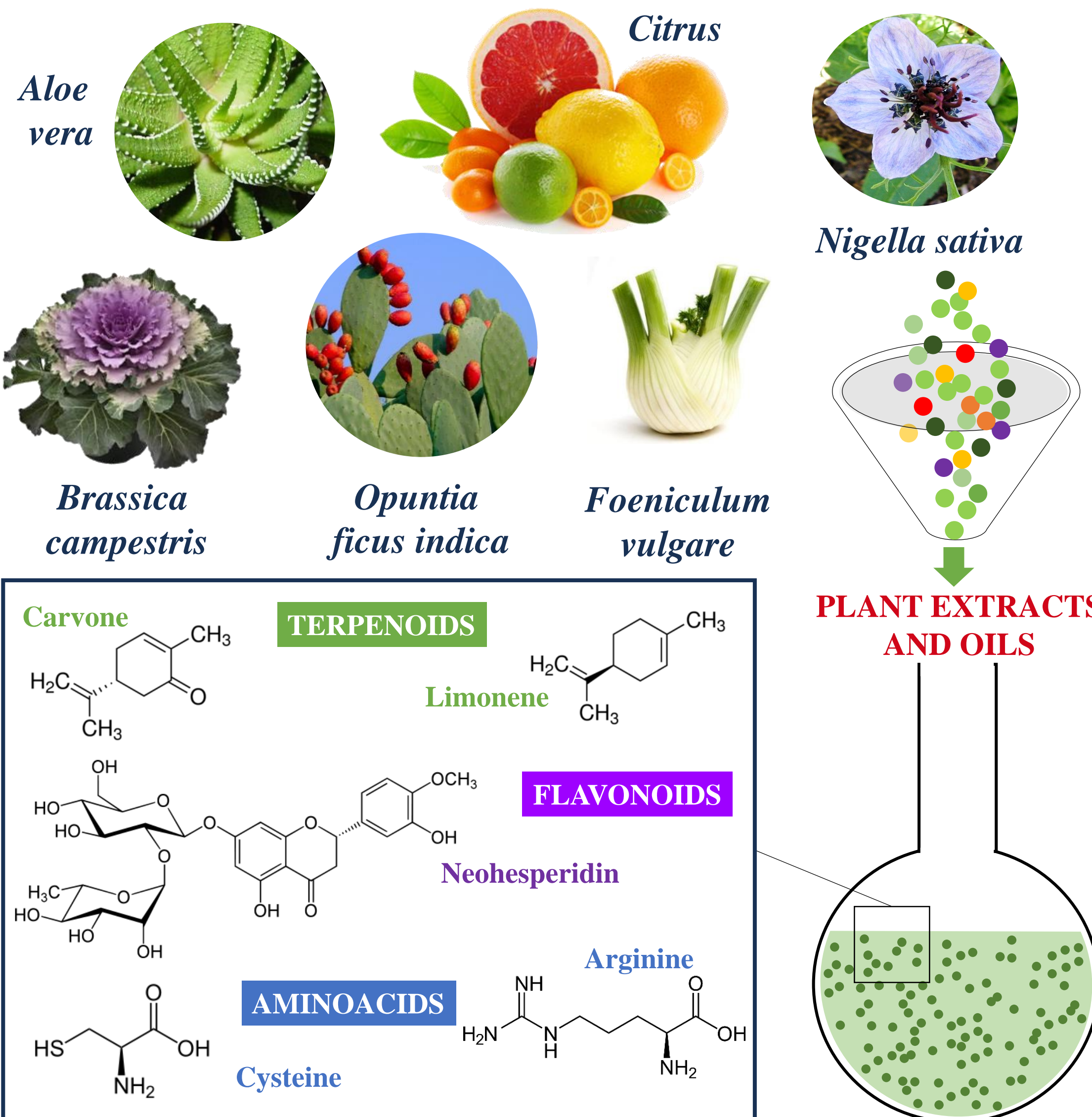
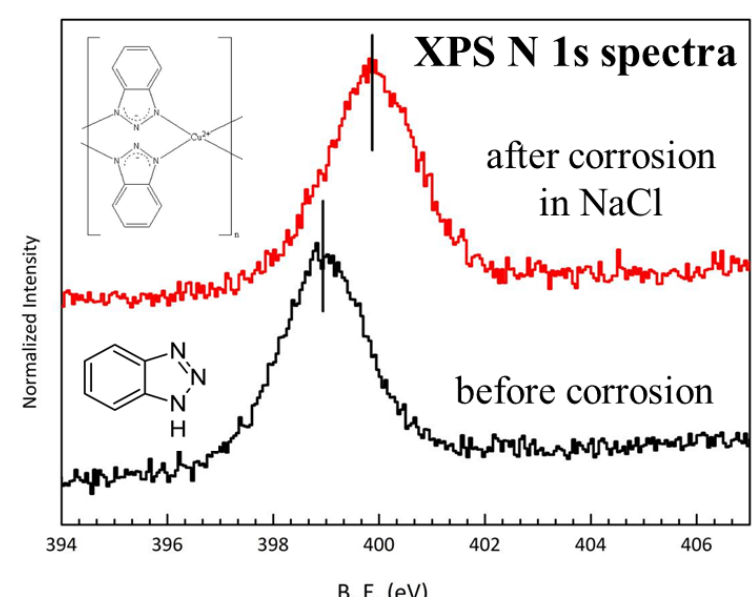
### VALIDATION



Nanocontainers, able to gradually release encapsulated active materials, can be employed to develop a new family of active multifunctional coatings, which possess not only passive functionality, but also rapid feedback activity in response to changes in local environment or in the coating's integrity. Incorporation of these nanostructured systems into a suitable matrix produces a coating that can act both as protection barrier and as inhibitor of corrosion/biological proliferation.



Suitable nanocarriers can be used for a controlled release of active agents in order to obtain an eco-friendly product and to increase the durability of the treatment.



### COLLABORATIONS

- Dr. A. Mazzaglia, R. Zagami @ ISMN-CNR c/o Dip. CHIBIOFARM, Università di Messina
- Dr. M. L. Testa, F. Giordano, V. La Parola @ ISMN-CNR, Area CNR Palermo
- Prof. G. Lazzara, Dr. R. Schimmenti @ Dip. DiFC, Università di Palermo
- Prof. M. Bruno et co. @ Dip. STEBICEF, Università di Palermo
- Prof. N. Hajjaji et co. @ Dep. of Chemistry, Université Ibn Tofail, Kénitra (Maroc)

Non-toxic and natural products gained increasing importance as 'green' nanostructured film of corrosion inhibitors or antimicrobials, due to the advantages of their eco-friendly and biodegradable nature, readily availability, renewable sources and low cost processing.