Abstract

The doctoral thesis presented under the title "*Hybrid inorganic-organic materials for the optical recognition of neutral and anionic species*" has had as its main objective the synthesis and characterization of organic-inorganic hybrid materials based on the combination of the principles of Supramolecular Chemistry and Materials Science.

Recent studies confirm that cooperation between these two areas of Chemistry allow the simulation of what natural living beings have been doing for millions of years in a natural way. At cellular level, many vital functions are related to the ability of a particular receptor to recognize a particular species, giving a specific answer. But what is more interesting is that in living organisms, most of these systems do not exist as dissolved molecules, but are bounded to a (bio)organic skeleton with more or less flexibility.

When we imitated these systems bearing in mind the supramolecular and analytical chemistry, we find that we need a sensory molecule able to join with the specie that we want to detect and at the same time, this union must produce a change in its physico-chemical properties giving as a result a signal. But moreover, if we take advantatge of the fact that siliceous nanostructured materials present a high physical and chemical stability and that they have cavities where the sensor system can be incorporated into, we have the synthetic hybrid organic-inorganic combination similar to the natural one.

In order to develop this idea, we have used sensor systems widely studied in molecular recognition processes in aqueous media and we have applied them to the inorganic-organic hydrid materials. Therefore, the present work thesis has been structured in two parts: on the one hand, the synthesis and characterization of the functionalized inorganic porous solid materials by the study and detection of amines using the "chemodosimeter" approach. On the other hand, we have made the synthesis and characterization of the organic functionalized inorganic porous solid materials for the study and detection of anionic species through the displacement assays approach.