Women in Science – 2nd Erlangen Symposium

# The challenge of preparing tailored materials and sharing knowledge with the new generations

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We live in a world avid for new materials, in a consumer society where science and technology have been at the service of producing more and better products since the industrial revolution. This voracity has made us neglect the planet we inhabit and today we have a serious problem of polluted water, air and soil that affect the life of all the species that populate the Earth. The art of chemistry has, until the end of the 20th century, focused on extracting natural resources and producing materials by privileging yield and conservation of process, without considering the impact of by-products.

Sol-gel processes are a mild synthetic approach -*Chimie douce*- that mimic the abilities of living organisms to synthesize inorganic compounds (carbonates, silicates, phosphates) at room temperature and with defined functionalities. Within this approach schematized in Figure 1 we have synthesized metallic oxides oriented to environmental prevention and remediation. Our motivation is to understand chemistry at the nanoscale to achieve a rational design of materials.

In this talk, I will present some examples of synthesis of $TiO_2$ photocatalysts, $SiO_2$ hydrogels for encapsulating microorganisms, and mesoporous oxides with tailored pore distribution. This controlled synthesis allowed us to contribute to unravel the complexity involved in the physical chemistry of interfaces in confined media.
In addition, I will discuss new approaches for sharing our scientific knowledge with students, opposite to traditional teaching, with aim to introduce the new generations in the world of complexity.

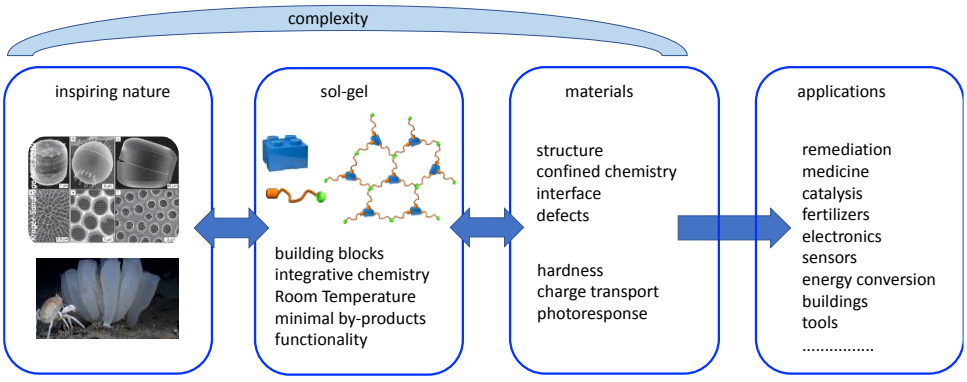


**Figure 1.** sol-gel integrative chemistry for building materials with targeted applications