

## **MARINE POLYSACCHARIDES AEROGELS: MATERIALS FOR CATALYSIS AND ADSORPTION**

Françoise Quignard

Institut Charles Gerhardt, Matériaux Avancés pour la Catalyse et la Santé, UMR 5253 CNRS-UM2-ENSCM-UM1, ENSCM, 8 rue de l'Ecole Normale, 34296 Montpellier Cedex 5, France

The introduction of renewable resources in the production of catalyst supports and adsorbent is only possible if the materials intended to replace oil-derived or energy-intensive solids comply with strict requirements, like as high surface area, appropriate surface chemistry and porosity, thermal and chemical stability, and low cost. Aerogels of natural polysaccharides are promising candidates for many applications, as they couple the textural properties of highly accessible materials with the versatile chemistry of hydrocolloids. Hydrocolloid-forming polysaccharides are natural polyelectrolytes able to gelify water when added in tiny amounts. Hydrogels containing 1-2 % polymer and 98-99 % water can be shaped as self-standing spheres or films with good mechanical stability. This property is at the basis both of their natural function as water-storage agents for living organisms as well as of their main application. Natural polysaccharides, albeit known for many years as supports for enzymatic catalysts and gelling agents in aqueous phase, suffer from diffusional limitations, due to the low surface area of the dried materials generally used, xerogels or lyophilised solids. This lecture deals with the proper methods to prepare dry materials which retain the dispersion of the polymer hydrogel, namely polysaccharide aerogels. The materials whose properties are herewith described satisfy most of the appropriate requirements for heterogeneous catalysts and supports: they are stable in most organic solvents and present numerous and diverse surface functionalities (like hydroxy, carboxy or amino groups). Their application in catalysis and adsorption could open substantial markets for products of seaweed harvesting and coproducts of seafood industry and provide a new opportunity to obtain materials from one of the less energy-intensive sources of biomass.