

The role of nano-structured materials in the development of catalytic conversion processes

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The growth of the world population is pushing the demand for energy. According to a recent study by the International Energy Agency, in the absence of countermeasures, the demand for energy will increase by the value of 10097 Mtoe in 2010 to reach in 2035 the value of 18676 Mtoe. This scenario can have a big impact on the health of our planet and it generates the urgent needs relative with respect to the availability of technologies for the production, transformation and use of energy and for the sustainability of the chemical conversion processes. In this context, it appears of particular urgency the issues related with the availability of renewable resources and the increase of the efficiency in the use of fossil resources both conventional and unconventional. An important contribution to the resolution of these problems will come from the catalytic processes, through the identification of catalysts and processes that are more efficient and responsive to new needs. In this context it will be of great help the availability of new materials and know-how required for the generation of nano-structures ad-hoc to provide new catalysts. Over the past thirty years, great strides have been made in materials science both on the side of synthesis and structural/physical-chemical characterization. These developments are the basis for the development of new technologies and have formed the bedrock from which to draw resources to address the new challenges. In this presentation, the author will discuss the contributions that the nanostructured materials belonging to different classes such as ordered-porous oxide materials, nano-clusters of supported metals, nano particles of sulfides of transition metals, can offer to the development of new technologies through examples drawn from his experience in the research and development laboratories of Eni company.