Fine chemicals syntheses and biomass valorisation in the presence of inorganic fluorides

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Catalysis is clearly one of the foundational pillars of Green Chemistry and it will continue to be one of the main vehicles that take the chemical enterprise into a future of sustainability. For this, the production of chemicals, nowadays based on catalysis (ca. 90% of chemicals produced *via* catalytic routes), should have to move from homogeneous to heterogeneous catalysis (whenever possible) in order to avoid product contamination, reduce the processing costs, enhance the recovery and favor recyclability of catalysts. Therefore, with the aim to improve older industrial processes or to initiate other nowadays new processes under a greener manner, novel selective efficient solid catalysts were created and developed.

For instance, until recently, inorganic metal fluorides played a minor role in the field of heterogeneous catalysis but the recent developments of new synthesis approaches toward nanoscaled metal fluorides significantly increased the interest in these materials. Moreover, the introduction of a second metal into these new compounds allows for further functionalization resulting in unlimited new compounds with high impact on catalytic applications for important industrial sectors, as fine chemicals and pharmaceutical ones. A variety of catalytic reactions performed with these new catalytic materials, in the area of fine chemicals synthesis will be presented. The most important envisaged fine chemicals synthesis were selected from those which still raises environmental problems at industrial level through the generated wastes and high energy consumption, as E and K vitamins synthesis and menthol synthesis [1-5].

But not only the unacceptable high level of wastes and pollution is the nowadays problem of the humanity. The important reduction of fossil fuel reserves on which is based the current world economy corroborated with the global pollution and climate change is a major political, economic and scientific concern. To survive, our civilization has to make a strategically shift toward renewable fuels/products obtained *via* sustainable processes. In this context, the discovery and development of novel and efficient pathways for the conversion of the valuable bio-polymers (i.e., cellulose, hemicellulose and lignin) into bio-chemicals (also named "platform molecules") are among the big challenges facing heterogeneous catalysis. The successful use of the novel inorganic hydroxylated nanoscopic fluorides catalytic materials in the primary building block production from renewable resources is a further evidence of their extraordinary catalytic capabilities. The scientific achievements in the development of these materials and their catalytic properties connected with the catalytic performances will be also discussed [6-9].

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