

Preparation of advanced heterogeneous catalysts via aerosol processing

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Aerosol processing is long known to obtain various types of divided materials. The attractive technical features of aerosol processes make them highly interesting for the continuous, large scale, and tailored production of heterogeneous catalysts. In the last two decades, advanced reactive aerosol processes have emerged as innovative means to synthesise tailored-made nanomaterials with tunable surface properties, textures, compositions, etc.[1] In particular, the “aerosol-assisted sol-gel” process (AASG) has demonstrated tremendous potential for the preparation of high-performance heterogeneous catalysts. The method is based on the sol-gel chemistry process, often coupled with the evaporation-induced self-assembly (EISA) concept [2]. It allows producing micronic or submicronic, inorganic or hybrid organic-inorganic particles bearing tuneable and calibrated porous structures at different scale.

After a brief overview of different types of aerosol processed materials which have demonstrated interesting performance as heterogeneous catalysts, we will present the (a) a new type of hybrid catalyst for chemoenzymatic cascade reaction (Fig. 1), (b) MoO_3 - and WO_3 -based mesoporous mixed oxides for olefin metathesis [3], (c) methylated Sn-Si mesoporous mixed oxides for ethyl lactate synthesis [4] and (d) NaAlO_2 microparticles for the synthesis of carbonates and carbonate esters [5].

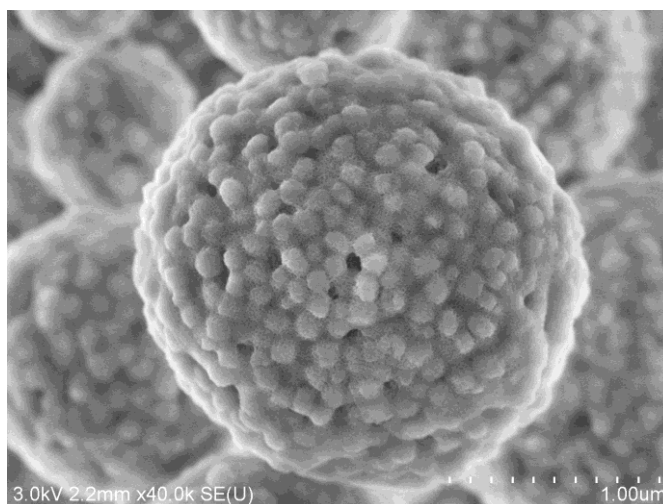


Figure 1. Hollow particles made of TS-1 zeolite seeds embed within a mesoporous silica “glue”. (unpublished)

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