Nanolayered MoS_2-Based Catalysts: A Convenient Choice for the Synthesis of Fine Chemicals

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Transition metal sulfides constitute a wide family of materials with many interesting applications in different research areas. In catalysis, cobalt (or nickel)-promoted MoS_2 materials have been extensively used as hydrotreating catalysts in petroleum refineries for upgrading crude feed-stocks.[1] Nevertheless, the full potential of these materials, and in particular their application for selective transformations in fine chemistry, has been overlooked by the scientific community. Herein, it is shown that under fine-tuning modification they become in highly active and selective heterogeneous catalysts able to carry out hydrogenation and hydrogen-autotransfer processes in an efficient way directed to the preparation of valuable organic chemicals. More specifically, we have prepared a series of nanostructured cobalt–molybdenum sulfide based-materials by a one-pot hydrothermal synthesis, which furnishes the obtained unsupported catalysts with a high number of actives sites per unit volume. As shown in Figure 1, they have been applied as catalysts for the chemo- and regioselective hydrogenation of nitro- and *N*-heteroarenes, as well as for the efficient C-S bond formation by reaction of alcohols with thiols.[2-4] An extensive characterization of the prepared nanostructured materials reveals their different composition, and how they undergo a continuing evolution during catalysis. Active phases responsible for the outstanding activity, chemo- and regioselectivity of these catalysts have been well-established.

References

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Figures

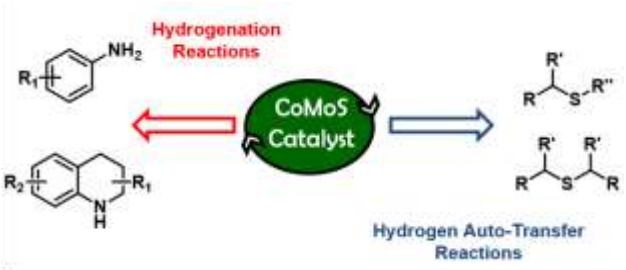

Figure 1: CoMoS-Catalyzed (Transfer-) Hydrogenation Reactions