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Abstract

Synthesis of Molybdenum Oxide and Sulfide Nanoparticles at Room Temperature Using Organometallic Approach †

Martin Jakoobi [1,*], Guillaume Carnide [1], Laure Vendier [1], Christian Bijani [1], Anne-Françoise Mingotaud [2], Richard Clergereaux [3] and Myrtil L. Kahn [1,*]

[1] Laboratory of Coordination Chemistry (LCC), CNRS UPR 8241, University of Toulouse, 205 Route de Narbonne, 31077 Toulouse, France; guillaume.carnide@lcc-toulouse.fr (G.C.); laure.vendier@lcc-toulouse.fr (L.V.); christian.bijani@lcc-toulouse.fr (C.B.)
[2] Laboratoire des IMRCP, University of Toulouse, CNRS UMR 5623, Paul Sabatier University, 118 Route de Narbonne, CEDEX 09, 31062 Toulouse, France; anne-francoise.mingotaud@cnrs.fr
[3] LAPLACE, CNRS UMR 5213, University of Toulouse, 118 Route de Narbonne, 31062 Toulouse, France; clergereaux@laplace.univ-tlse.fr
* Correspondence: martin.jakoobi@lcc-toulouse.fr (M.J.); myril.kahn@lcc-toulouse.fr (M.L.K.)
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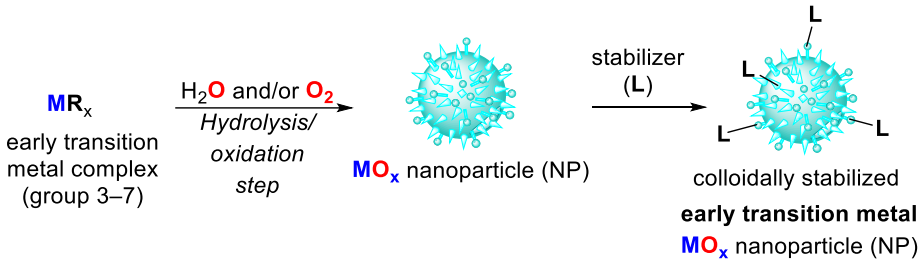
In the early 1990s, the seminal work by B. Chaudret and J. S. Bradley led to the establishment of metal nanoparticle (NP) synthesis from organometallic precursors. Since then, this methodology has attracted the attention of many research groups, ours included, and offered possibilities to selectively control the shape and size of these nano-objects under mild reaction conditions. The clever design of substrate and stabilizing ligand systems has allowed the synthesis of late transition metal and their oxide NPs (group 8–12) from precious metals (Ru, Rh, Pd, Pt, Ag, Au) and from first-row (Fe, Co, Ni, Cu, Zn) metal complexes [1,2]. However, to this day, the development of suitable early transition metal complexes (group 3–7) for the preparation of corresponding oxide, sulfide, etc., NPs has attracted only sporadic attention.

This presentation will focus on the use of the highly reactive Mo(0) complex for the synthesis of molybdenum oxide and sulfide NPs at room temperature. These results will illustrate how the choice of the substrate, stabilizing ligand and solvent system can lead to stable colloidal NPs with a diameter of <10 nm in size (Scheme 1).



Scheme 1. Synthesis of early transition metal oxide NPs using organometallic approach.

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