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► **To cite this version:**

Martin Jakoobi, Katia Fajerweg, Myrtil L Kahn. From Organometallic Chemistry to Multifunctional Nanoparticle-Based Devices for Gas Detection and Degradation of Air Pollutants. Proceedings, 2023, 92 (1), pp.42. 10.3390/proceedings2023092042 . hal-04304424

**HAL Id: hal-04304424**

**<https://hal.science/hal-04304424v1>**

Submitted on 24 Nov 2023

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Abstract

# From Organometallic Chemistry to Multifunctional Nanoparticle-Based Devices for Gas Detection and Degradation of Air Pollutants <sup>†</sup>

Martin Jakoobi <sup>1</sup>, Katia Fajerwerg <sup>1,2</sup> and Myrtil L. Kahn <sup>1,\*</sup>

<sup>1</sup> Laboratory of Coordination Chemistry (LCC), CNRS UPR 8241, University of Toulouse, 205 Route de Narbonne, 31077 Toulouse, France; martin.jakoobi@lcc-toulouse.fr (M.J.); katia.fajerwerg@lcc-toulouse.fr (K.F.)

<sup>2</sup> Université de Toulouse, UT3 Paul Sabatier, 118 Route de Narbonne, CEDEX 04, 31062 Toulouse, France

\* Correspondence: myrtil.kahn@lcc-toulouse.fr

<sup>†</sup> Presented at the International Conference EcoBalt 2023 “Chemicals & Environment”, Tallinn, Estonia, 9–11 October 2023.

**Keywords:** organometallic chemistry; nanoparticles; mild conditions; size control; pollutants degradation



**Citation:** Jakoobi, M.; Fajerwerg, K.; Kahn, M.L. From Organometallic Chemistry to Multifunctional Nanoparticle-Based Devices for Gas Detection and Degradation of Air Pollutants. *Proceedings* **2023**, *92*, 42. <https://doi.org/10.3390/proceedings2023092042>

Academic Editors: Monika Mortimer, Anne Kahru, Ivo Leito, Riin Rebane and Villem Aruoja

Published: 24 November 2023



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Considering the climate, societal and health-related current and emerging issues facing the world, our group, as part of the (nano-)material science community, will play a part in providing materials and technology that can tackle these issues. Our strategy focuses on the design and development of complex hybrid nano-objects and nanomaterials with unprecedented properties, with the aim of developing functional and innovative solutions to societal challenges (Figure 1). To achieve this, we are applying an organometallic approach for the synthesis of well-defined nanoparticles (NPs) and nanomaterials [1]. This bottom-up approach allows control of the NPs synthesis (size, shape, colloidal stability) on a molecular level with the help of cleverly designed starting molecular precursor(s), under mild reaction conditions and in safe-by-design approaches [2]. The presentation will focus on our team’s research related to the synthesis and properties of NPs and nanomaterials, their implementation into devices for either gas detection (i.e., sensors based on Cu [3], Zn [4,5], and Sn oxide NPs [6,7]) or degradation of air pollutants [8], and the interconnection between different fields (chemistry, physical chemistry, physics, and biology).



**Figure 1.** Positive feedback loop on the development of new nanomaterials and technological solutions to societal needs.

**Author Contributions:** Writing—original draft preparation, M.J.; writing—review and editing, K.F. and M.L.K.; supervision, K.F. and M.L.K. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by the Centre National de la Recherche Scientifique, CNRS and Université de Toulouse.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** The data presented during the oral presentation was based on the references above, from where relevant research data can be found.

**Conflicts of Interest:** The authors declare no conflict of interest.

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