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## New versatile nanostructured catalysts: From green preparation to environmentally concerned challenges

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Effective catalysts that could assess multiple environmental issues are nowadays needed, in a context of growing societal awareness and newly appeared environmental legislations. Challenges for these catalysts are numerous: Their production has to be as green as possible, fast and easy to handle; their use conditions have to be as soft as possible without compromising the requirements for high selectivity and high activity; they have to be nearly indefinitely reusable. These drastic requisites have oriented research toward soft preparation methods leading to nanostructured heterogeneous catalysts in which very active species are designed at the nanoscale. Our work aims at developing innovative nanostructured ruthenium based catalysts with, as chosen fields of investigation, the methanation of CO<sub>2</sub> (valorisation of CO<sub>2</sub>), the total oxidation of volatile organic pollutants (treatment of gas effluents from incineration and biomass cogeneration units) as well as soft conditions ammoniac synthesis. In supported catalysis, although the primary role of the support is often thought to be limited to physical dispersant for intact metal active nanoparticles, it is now recognized that the metal-support interactions clearly influence the catalytic activities and/or selectivity. Moreover, supported RuO<sub>2</sub> nanoparticles have clearly showed the ability to migrate over the support surface upon thermic treatment, this phenomenon being strongly support-dependent. This epitaxially-driven migration provokes decisive modifications in the catalyst and can be exploited to tune the catalyst active phase morphology, localization and thus activity.

### Biography

Capucine Sassoie is Maitre de Conférences at UPMC. She is currently working on hybrid and inorganic nanomaterial, coupling the sol-gel chemistry with advanced processing to tune both the macroscopic shape and the texture of the materials. One particular research deals with sustainability, concerning both material synthesis and its further applications. She has so far authored/co-authored 25 peer-reviewed journal articles and given 5 presentations in international meetings.

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