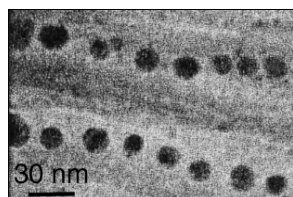


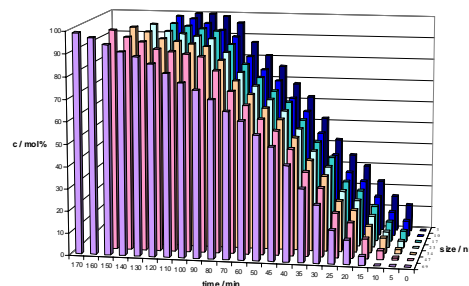
Noble metal nanoparticles deposited onto a support

The organometallic synthetic method developed in the laboratory can also be applied for the **synthesis of metal nanoparticles onto the surface or inside the pores of inorganic porous materials** (silica, alumina, organised mesoporous materials, alumina membranes,...) leading to **supported nanomaterials** displaying controlled nanoparticles in size and dispersion. Such supported nanomaterials are synthesized through *in situ* precursor decomposition, following the **classical impregnation method** or **impregnation in a fluidized bed**, and can be used as **supported catalysts**:

- **Ru nanoparticles inside the channels of alumina membranes** displayed interesting activities for **butadiene hydrogenation** and **carbon monoxide oxidation** in gaseous phase (collaboration with Pr G. Schmid, Germany):

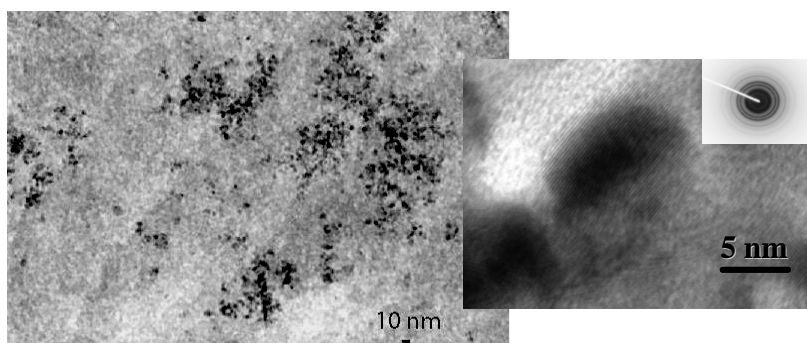


Particles size / nm	Pore diameter / nm	Time / min for 100 % conversion
5	21	40
17	28	60
20	42	65
24	42	76
34	56	84
47	70	97
69	84	102



Butadiene hydrogenation with Ru NPS synthesized inside alumina membrane channels :
increasing of the catalytic activity when NPs size decreases

- **Pd and Fe nanoparticles deposited inside the pores of a silica** using the impregnation method in a fluidized bed, gave rise to **olefin hydrogenation** and **carbon nanotubes synthesis** respectively (collaboration with Pr M. Hémati, LGC/ENSIACET et Pr P. SERP/ENSIACET)



A fluidized bed installed in a glove box allowing the synthesis of metal nanoparticles under a controlled atmosphere and TEM and HREM images of Pd nanoparticles inside a porous silica

- **Organized and functionalized mesoporous materials containing Ru oxide nanoparticles** are effective **catalytic filters** for increasing the **gas selectivity of gas sensors**

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