# From unusual $N_2$ splitting to single layer growth on wafers by surface organometallic chemistry

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Transition metals can play a central role devices such as catalysts, sensors, transistors, or photoluminescence. The existence of an isolated metal atom, sometimes the essential condition to avoid multi-metal deactivation phenomena, requires the presence of a dispersion medium. The solid phase appears advantageous as such dispersion medium for many applications (such as embarked systems, high temperature processes, nanoscale technologies), but defects in the starting solid or lack of control over the positioning of the metal atom can lead to not-ideal final performances of the device.

Thanks to Surface Organometallic Chemistry (SOMC), traditionally applied to the synthesis of single site heterogeneous catalysts, it is possible to control on an atomic scale the positioning and the environment of the active metal grafted on surface.

This presentation will review some recent examples in the field of surface organometallic chemistry on silica surfaces, inside metal organic framework (MOFs) cavities, and over silicon wafers. The applications will be unusual coordination chemistry (viz. $N_2$ splitting with $H_2$ on an isolated metal center), heterogeneous catalysis ($CO_2$ reduction) and controlled growth of a semiconducting thin layer on a silicon wafer.