

Title:

The heterogenization of highly active Gold(I)-NHC catalysts on periodic mesoporous organosilicas

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Abstract:

Nowadays, the development of heterogeneous catalysts has attracted a lot of attention as they are easily recyclable and reduce costs and waste. The heterogenization of expensive but very active metal complexes is thus an interesting and “green” alternative. As these heterogeneous catalysts need to be recycled and regenerated many times, the support material itself and the coupling with the metal complex must be stable to avoid leaching of the active species.

Our research group is specialized in the development of nanomaterials for catalytic applications, e.g. Periodic Mesoporous Organosilicas (PMOs).¹ These hybrid nanomaterials are extremely versatile due to the modification possibilities of the organic bridge. Very straightforward “click reactions” can be used to easily anchor active metal complexes via the ligands.²

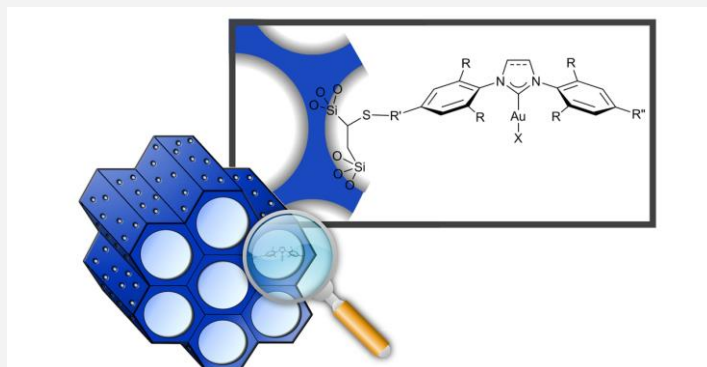


Figure 1: Heterogenization of a Gold(I)-NHC catalyst on a thiol PMO.

In this contribution, we focus on the heterogenization of N-heterocyclic carbene or NHC-based Gold(I) catalysts as they are very active and are already used in a wide range of catalytic reactions such as C-C coupling reactions and isomerisation reactions. We anchored a Au(I)-NHC catalyst on a thiol PMO³ and used a thiol click reaction to create a stable coupling between the support and the NHC ligand. Several characterization techniques were used to confirm successful anchoring and catalytic experiments showed the development of an excellent heterogeneous catalyst.

¹ P. Van Der Voort, D. Esquivel, E. De Canck, F. Goethals, I. Van Driessche, F.J. Romero-Salguero, *Chem. Soc. Rev.*, 2013, 42, 3913.

² S. Clerick, E. De Canck, K. Hendrickx, V. Van Speybroeck, P. Van Der Voort, *Green Chem.*, 2016, DOI: 10.1039/C6GC01494A.

³ D. Esquivel, O. van den Berg, F.J. Romero-Salguero, F. Du Prez, P. Van Der Voort, *Chem. Commun.*, 2013, 49, 2344.