We report a series of catalyst L1-L4 (see Figure 1) composed of one or two lipophilic thioether side-chains that binds gold(III) chloride. Upon excitation using visible light, the Au$^{III}$ ions are smoothly reduced to Au$^{I}$. The mechanism of reductive elimination was studied as well as the thermal reduction of these complexes.

The complexes of Au(III) and Au(I) were evaluated in classical catalysis (cyclization of propargylic amides) and in a new cascade reaction towards a fused N-heterocyclic polyaromatic compound.

When photoreduction of complex L1 is achieved in the presence of water, crystalline gold nanoparticles of 20-50 nm diameter are obtained. Using a biphasic reactor, the photocatalyst shows average turnover numbers of 150 atoms of Au$^{III}$ reduced to Au$^{0}$ per molecule of photocatalyst.

![Figure 1. Thioether ligands for Gold homogeneous catalysis](image)

**References**

2. Z. Cao, D. M. Bassani, B. Bibal, *manuscript under preparation*.

Corresponding author email: brigitte.bibal@u-bordeaux.fr