

Co-directed MSc position available in the groups of Louis CUCCIA and Garry HANAN
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HEMI-LABILE DENDRIMERS AS LIGANDS FOR HOMOGENEOUS AND HETEROGENEOUS CATALYSIS

The aim of the project is to develop polymetallic dendritic nanocatalysts with hemi-labile phosphorus/sulfur metal coordination sites (P,S -units) located at the periphery of dendrimers in anticipation of their application to homogeneous and heterogeneous catalysis. In this new class of dendrimer, the hemi-labile thioether group is essential: it is readily displaced from a metal ion to allow substrate binding and catalysis and it also allows for the adsorption of the dendrimer onto a surface (Fig. 1). The dendrimers will have a strong tendency to bind through the S -donors, while the P,S -units on the opposite side of the dendrimer are still available for metal ion binding (Fig. 1b). This does away with the difficult synthesis of non-symmetric dendrimers with one site specifically made to bind to a surface and the other side specifically made to bind to metal ions. In this strategy, the two sites are the same and allow for practical syntheses to be developed. Thus, the P,S groups are both good surface binders and good metal ion binders, albeit for different reasons, the S -donor for the former and the P -donor for the latter. The dendritic nanocatalysts proposed herein have not previously been studied (Fig. 2).

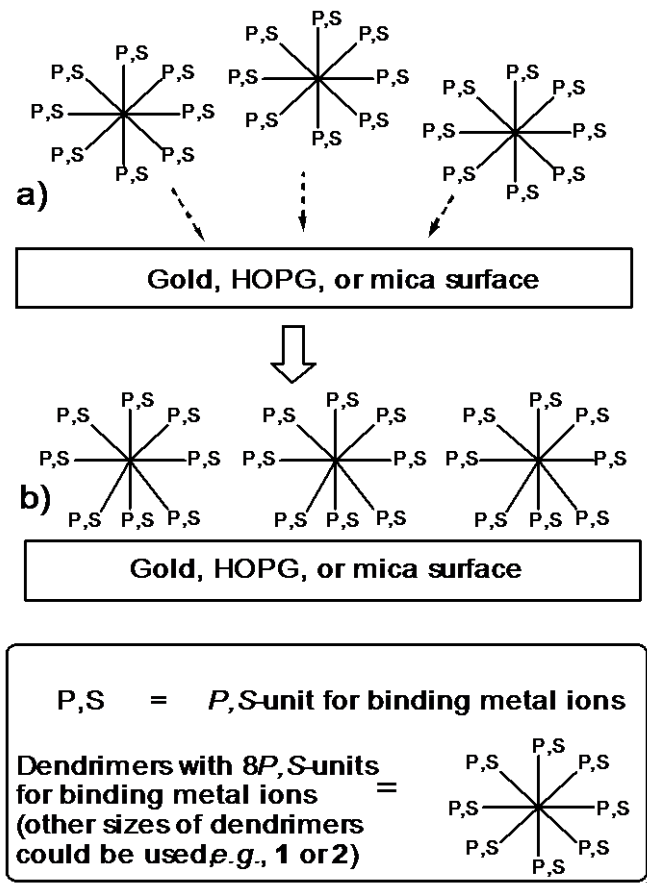


Figure 1. Application of P,S hemi-labile dendrimers to a gold, HOPG or mica surface. a) P,S -dendrimers are applied to a surface; b) characterization of surface coverage and order in prelude of metal complexation.

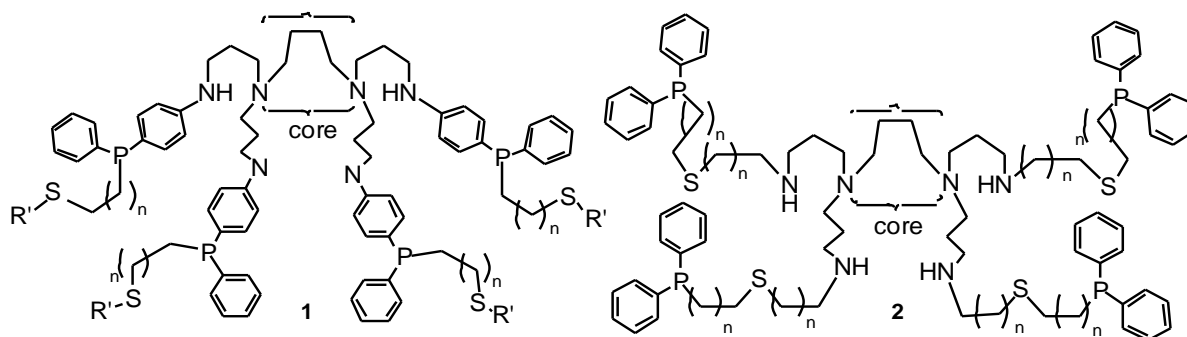


Figure 2 Examples of P -tethered (**1**) and S -tethered (**2**) dendrimers for use in homogeneous and heterogeneous catalysis ($n = 0-5$). Polyamine dendrimers with greater than four amine groups (e.g., 8, 16, 32, or 64) could also be introduced onto the central core.