

# Lanthanide Borohydrides and Precious Metal Functionalized Polymers

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Rare earth borohydride complexes have been used in the polymerization of polar monomers for just over a decade. Our contribution to the synthesis and characterization of these complexes is shown first. Their catalytic behavior in ring-opening polymerization of cyclic monomers, including lactones, lactides, and carbonates addressed.<sup>1</sup>

The second part deals with metal functionalized polymers. A tetrazole-based photoligation protocol for the spatially resolved encoding of various defined metallopolymers onto solid surfaces is shown. By using this approach fabrication of bi- and trifunctional metallopolymer surfaces with different metal combinations were achieved. Specifically,  $\alpha$ - $\omega$ -functional copolymers containing bipyridine as well as triphenylphosphine ligands were synthesized via reversible addition-fragmentation chain transfer (RAFT) polymerization and subsequently metal loaded to afford metallopolymers of the widely used metals gold, palladium and platinum (Figure 1).<sup>2</sup>

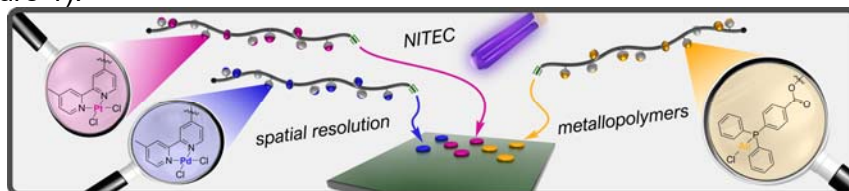
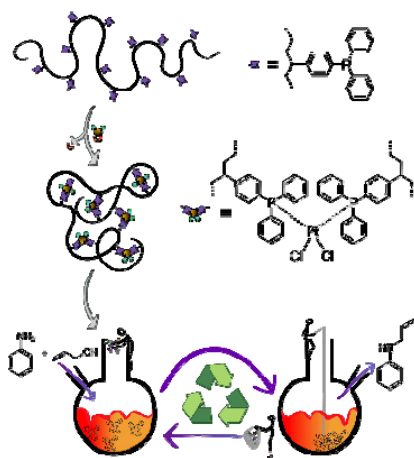


Figure 1. Schematic overview of the fabrication of bi- and trifunctional metallopolymer surfaces with different metal combinations.



Finally, the synthesis and characterization of platinum(II)-crosslinked single-chain nanoparticles (Pt<sup>II</sup>-SCNPs) is discussed. For the synthesis of the Pt<sup>II</sup>-SCNPs, [Pt(1,5-cyclooctadiene)Cl<sub>2</sub>] was added to polymers featuring triarylphosphine ligand moieties along the backbone. In dilute solution, this allows for the intramolecular crosslinking of single chains resulting in Pt<sup>II</sup>-SCNPs. These Pt<sup>II</sup>-SCNPs were used as recyclable homogeneous catalysts for the amination of allyl alcohols. Although the platinum complex is anchored to the polymer backbone, the Pt<sup>II</sup>-SCNP system is as active and as selective as the homogeneous reference catalyst.<sup>3</sup>

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