**Immobilization on a nanomagnetic Co/C surface using ROM polymerization: Generation of a novel hybrid material as support for a recyclable palladium catalyst**

**Technology ID:** 11KU001L  
**Status:** Patent Pending

**Introduction:** The use of catalysts and ligands to perform chemical transformations is indispensable. Corresponding purification of the transformations, however, can be tedious, time-consuming, expensive process. While scavengers can assist in the purification, the scavengers themselves must be removed via some purification procedure. Recent advances in the development of facilitated chromatography-free procedures include: supported reagents, fluorocarbon tags/residues, phase switching, and alternative reagents.

In particular, ring-opening metathesis polymerization (ROMP) derived high-load oligomeric reagents and scavengers are easily tuned to be soluble in a variety of organic solvents, enabling a fully homogeneous process. Facile purification can be achieved via selective precipitation and filtration of the polymeric reagents and scavengers to yield high purity products. Such selective precipitation, however, requires adding a second solvent - a potential drawback in certain industrial processes.

Functionalized nanomagnetic particles allow for simple and rapid separation by applying a magnetic field and decanting. Loading on the nanomagnetic particles is very limited. While low particle loadings can be advantageous in certain instances, such advantages are usually outweighed by problems associated with the sheer mass of support necessary to provide viable reactions.

**Invention:** The invention consists of a high load, highly magnetic ROMP material with tunable solubility properties as a readily reusable ligand and/or a catalyst or as a recyclable reagent scavenger. Separation of the material from reaction mixtures only requires decantation with an applied magnetic field, allowing the material to be readily recovered and reused.

For magnetic materials that are metal containing catalysts, metal leaching is insignificant. The overall strategy has been demonstrated by constructing a palladium catalyst that is applied in Suzuki coupling reactions where the catalyst can be easily recycled and reused multiple times.

**Advantages:**
- High-load, soluble ligands, catalysts, and scavengers.
- Simple purification through magnetic decantation.
- Reduce cost of product separation while retaining homogeneous reactivity profiles.

**Possible Applications:**
- Catalysts.
- Ligands (chiral and achiral).
- Scavengers.
- High throughput platforms.

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