

Strategies for Covalent Supporting of Rh-NHC Hydrofunctionalization Catalysts on Graphene-based Materials

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Graphene possesses high conductivity, surface area, and tunability, making it an ideal support for the covalent immobilizing of molecular catalysts. Carbon-based nanohybrid catalysts have shown promise both in terms of activity, selectivity, stability and/or recyclability. Graphene oxides (GO) which can be considered as oxidized graphene sheet, or partially reduced graphene oxides (rGO) obtained by thermal treatment of GO at different temperatures, can be easily chemically modified for tailoring materials with the desired functionalities. This approach was successfully applied for the preparation of Ir-NHC hybrid materials through carboxylate/carbonate/acyl bonds that have shown an excellent performance in hydrogen transfer reactions.¹ Unfortunately, related Rh-NHC hybrid materials exhibit a limited applicability for hydrofunctionalization reactions of unsaturated compounds due the presence of reactive C-O bond that eventually leads to leaching. In order to overcome this setback, we have developed two different functionalization strategies using GO and rGO: i) via C-N bond, decorating the graphene derivatives with azide groups which have been coupled with alkynes yielding triazole rings, precursors for a triazolium moiety, or ii) via C-C bond, decorating the graphene with aryl-azolium salts generated through diazonium salts (Figure 1). Preliminary results on the application of these hybrid catalysts in alkyne hydrosilylation reactions are presented.

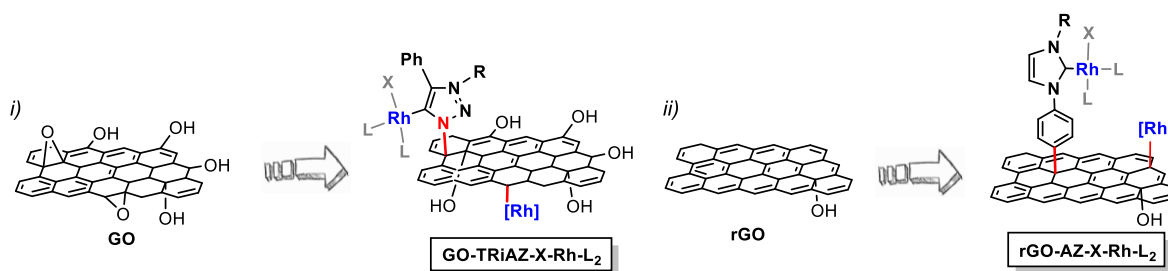


Figure 1. Strategies of covalent functionalization of graphene materials

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References

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