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Modified Carbon Nanoforms Systems for Asymmetric Catalysis

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In the last years the chemistry of carbon nanoform (CNFs) attracted attention in the field of catalysis, especially in the preparation of last generation nanostructured catalysts. Here are reported synthesis and catalytic applications of chemically modified nanocarbons such as C_{60}, carbon nanohorns and nanotubes The well-developed chemistry for CNFs functionalization allows operating multiple additions on their structures, and this can be exploited for sensibly increasing catalyst loading or for adding different functionalities.[1] In this way, it is possible to explore synergistic or detrimental effects due to the close proximity of catalytic moieties. In addition, the peculiar solubility profile of CNFs-derivatives may be used for recovering a homogeneous catalyst by simple precipitation.
Herein CNFs were functionalized with a series of chiral bisoxazoline (BOX) ligands, widely used in asymmetric catalysis.[2] In the case of C_{60}-adducts, these were functionalized in order to obtain mono- and hexakis-adducts as well as monoadducts endowed with ten 1,2-dimethylimidazolium moieties in order to get hybrid with a different solubility profile (Figure 1a). All the CNFs-BOX systems were employed, along with copper(II) salts as catalysts in asymmetric Henry and Diels-Alder reactions (Figure 1b). Furthermore, their ease separation from the reaction mixture allow for a facile reuse in multiple cycles.

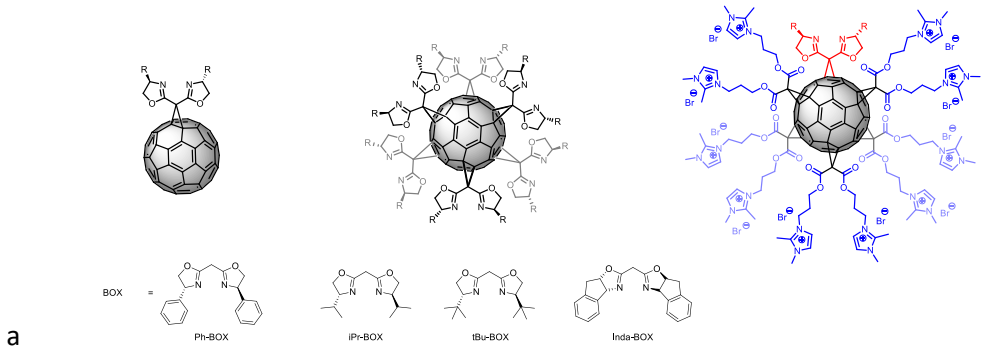

Figure 1 a) Fullerene and BOX based catalysts. b) Asymmetric Henry and Diels-Alder reactions.

References:

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[2] (a) Evans, D. A.; Woerpel, K. A.; Hinman, M. M.; Faul, M. M., *J. Am. Chem. Soc.* **1991,** *113* ,726 - 728; (b) Lowenthal, R. E.; Abiko, A.; Masamune, S., *Tetrahedron Lett.* **1990,** *31*, 6005 - 6008.