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SURFACE FUNCTIONALIZATION OF CARBON NANOTUBES WITH METAL COMPLEXES: APPLICATION TO ENANTIOSELECTIVE HYDROGENATION REACTIONS

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The use of carbon nanotubes, leader material in nanotechnology, in catalysis, has already been the object of numerous studies, which they have recently reviewed [1]. Two classes of systems can be distinguished, first the CNTs as catalysts by themselves, and second the CNTs as new catalyst supports, which constitutes the main part of the studies. In the last case the active phase composed of small size metal or metal oxide nanoparticles is deposited exclusively on the outer surface of the CNTs.

The preparation of enantiopure products represents more and more an essential requirement in the synthesis of chiral fine chemicals, especially when these compounds find application as building blocks in the synthesis of pharmaceuticals, cosmetics and agrochemicals. The substitution of classical homogeneous asymmetric catalysts by heterogeneous asymmetric catalysts is a field of growing interest from both an industrial and an academic point of view. In this context, we have investigated new catalytic systems by the use of chiral alkaloids and metal complexes supported on carbon nanotubes (CNTs) for enantioselective epoxidations of alkenes. This involves the immobilization of chiral ligands such as DIAM-BINAP [(2,2'-Bis(diphenylphosphino)-(3,3'-diamino)-1,1'-binaphthyl)] or the Pybox-NH_2 [4-(p-Aminophenoxy)-2,6-bis[(S)-4-isopropyloxazolin-2-yl]pyridine], on the outer surface of CNTs and then foncionalisation by a metal. Very innovative ways, for the grafting of ligands and stabilization of the metal (catalyst) have been proposed.