

Aim and scope

The development of environmentally friendly chemical processes and catalysis that use benign solvents as a reaction media and can recover and reuse the catalyst is one of the main challenges of the current research. The aim of the present thesis is to apply alternative solvents, water and supercritical carbon dioxide, in such important catalytic processes as the hydroformylation of long chain alkenes and the copolymerization of carbon monoxide and tert-butylstyrene. Various strategies have been used to achieve these goals.

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Chapter 3 focusses on the hydroformylation of 1-octene and 1-decene in water biphasic systems catalysed by rhodium complexes associated with sulfonated diphosphines, 1,3-bis(diphenylphosphino)propane (dpppts) and 1,4-bis(diphenylphosphino)butane (dppbts) (Figure 1). The aim is to study the effect on activity and selectivity of the addition to the catalytic system of cationic (CTAHSO₄) and anionic (SDS) surfactants and a dendrimer (Figure 2) in order to improve the mass transfer.

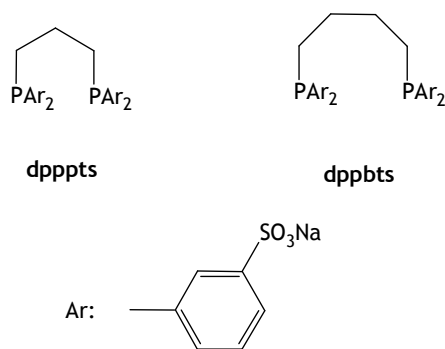


Figure 1

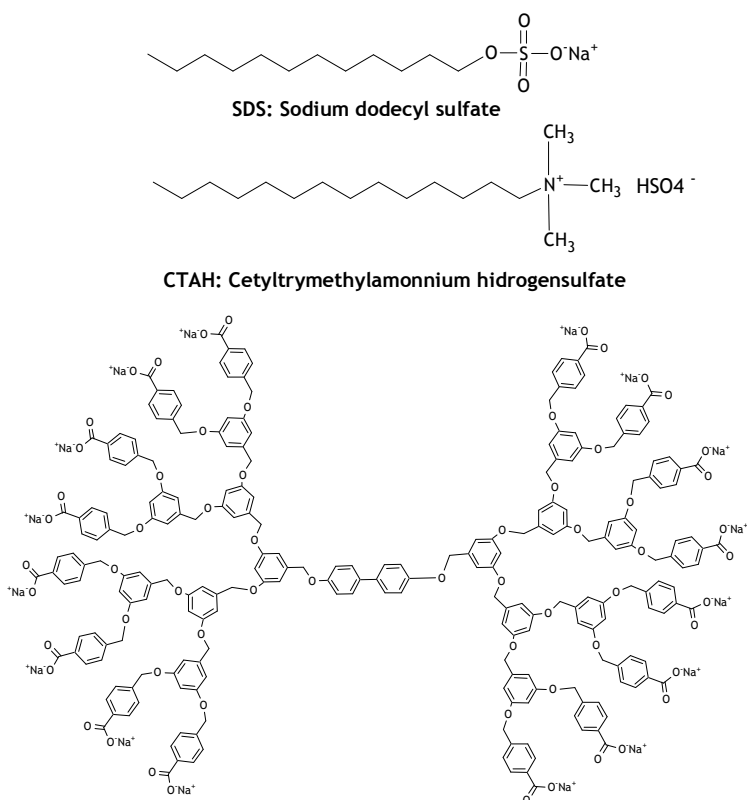


Figure 2

- The objective of **Chapter 4** is to synthesize three new P-donor ligands (Figure 3) with alkyl-branched chains in order to apply them in the hydroformylation of 1-octene in supercritical carbon dioxide. The coordination chemistry of these ligands to rhodium and palladium will be also studied

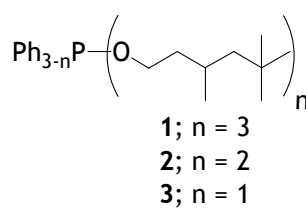


Figure 3

- **Chapter 5** deals with the application of a previously described fluorinated phosphine (Figure 4) in the hydroformylation of alkenes in supercritical carbon dioxide.

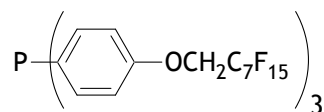


Figure 4

- The aim of **Chapter 6** is to synthesize N-donor fluorinated ligands (Figure 5), coordinate them to palladium and apply them as catalysts precursors for the alternating copolymerization of carbon monoxide and *tert*-butylstyrene using supercritical carbon dioxide as a reaction medium.

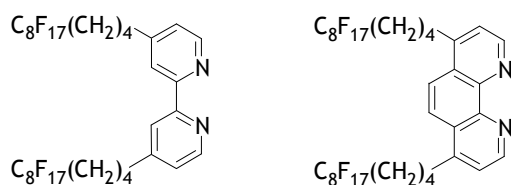


Figure 5