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# ABSTRACTS

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# CARBON SUPPORTED NOBLE METAL CATALYSTS PREPARED BY PHOTOCHEMICAL DEPOSITION

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Photochemical deposition of noble metals in different supports is gaining importance because of its simplicity and advantages. Its main advantage is the ability of spreading very effectively the metal throughout the support, thus leading to very high dispersions, resulting in higher molecular control, with a positive effect on both activity and selectivity. This type of catalysts is important for industrial preparation of fine chemicals. A common synthetic route in these processes is the selective catalytic hydrogenation of organic substrates containing unsaturated functional groups, like steroids or α,β-unsaturated aldehydes.

In the present study, hydrogenation catalysts prepared by photochemical deposition [1] are compared against the usual incipient wetness catalysts and other commercial available catalysts. Different supports were tested (carbon nanotubes, fullarenes, carbon fibers and titania) in order to establish potential metal to support interactions. Catalyst loads are also varied in order to achieve the desired conversion and selectivity.

The prepared catalysts were used in hydrogenation reactions to test their activity and selectivity. In the case of the model reaction of cinnamaldehyde selective hydrogenation, we tested a series of multi walled carbon nanotubes (MWNT) supported Pt catalysts with different thermal treatments, leading to different oxidation states of the metal .The reaction mixture contained heptane (solvent), cinnamaldehyde, decane (as an internal standard for gas chromatography) and the catalyst. The reaction temperature was 363K and the reaction started by feeding the reactor with hydrogen to a 10 bar pressure. Small aliquots of the reaction mixture were taken throughout the reaction to perform quantitative analysis (conversion and

product selectivity). The analysis was performed in a GC DANI 1000, equipped with a WCOT Fused Silica column.

As example, we present the hydrogenation of cinnamaldehyde using a 1% Pt/MWNT, in mild conditions of 363 K and 10 bar of hydrogen pressure. A good selectivity for the cinnamyl alcohol is obtained after one hour of reaction.

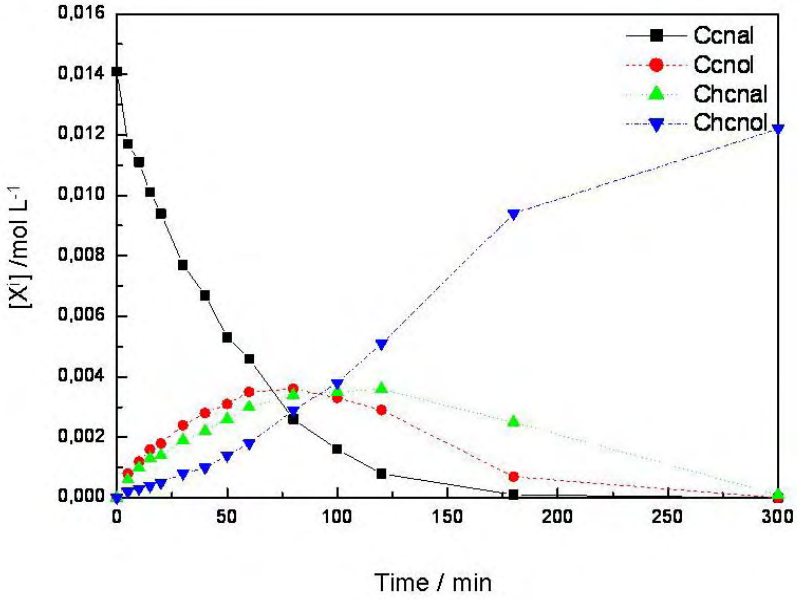


**Figure 1** – Concentration of reactants and products as function of time. Ccnal: cinnamaldehyde; Ccnol: cinnamyl alcohol; Chcnal; hydrocinnamaldehyde; Chcnol hydrocinnamyl alcohol.

The photodeposition method is able to produce active and selective catalytic materials for selective hydrogenation of cinnamaldehyde.

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