



***Ph.D. School in Chemical Sciences
Cycle XXXVIII***

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Research project title: Hydrogen chemical storage of organic substrates via LOHC promoted by heterogeneous catalysts: catalytic, kinetic, and thermodynamic aspects

Key words LOHC, heterogeneous catalysis, kinetics, process development

Research project abstract: Hydrogen allows the production of energy in the absence of fossil fuels. It is generally transported or stored in two ways: high-pressure gas (300 bar); liquid at low temperature ($T = -252.8^{\circ}\text{C}$). These transport/storage routes show some disadvantages, such as the cost or the danger of the process. To overcome this, it is possible to transport hydrogen through LOHC (*Liquid Organic Hydrogen Carriers*), based on: (i) hydrogen chemical storage through hydrogenation reaction of an unsaturated organic substrate; (ii) hydrogen chemical release by dehydrogenation reaction. Although the route is promising, the process has not yet been optimized, both in terms of chemical aspects (kinetics, catalysis, and thermodynamics) and technological aspects (reactor configuration). The following PhD project aims to optimize the LOHC process such as to allow the realization of a prototype operating in flow.