Synthesis of tailored materials by the sol-gel process

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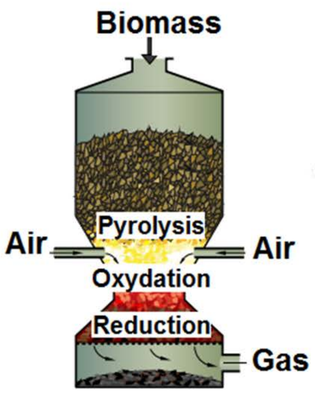
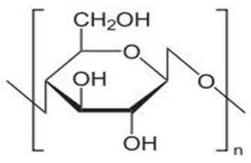
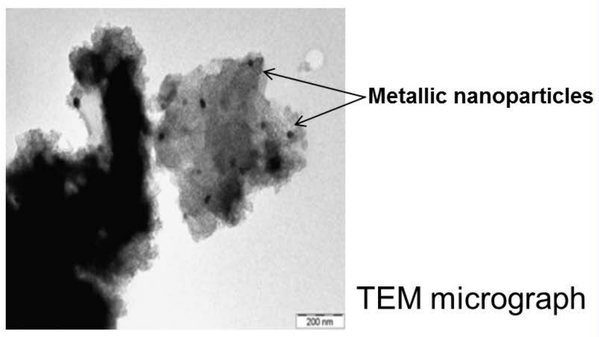
Biomass Gazification : Catalytic Purification of Bio-Syngas

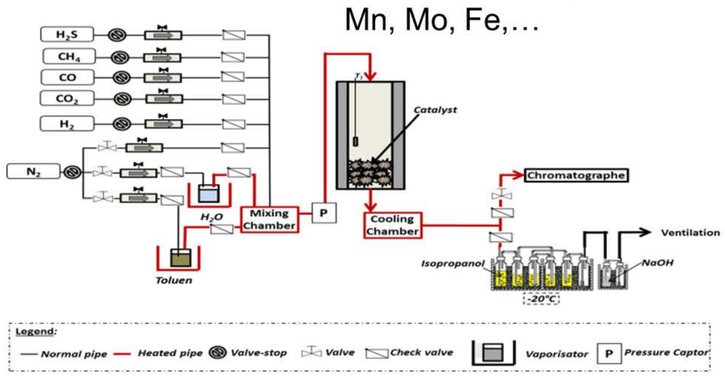


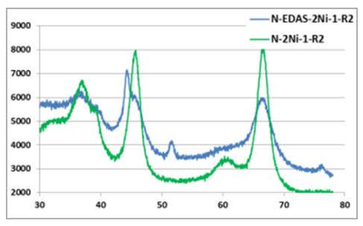




TEM micrograph

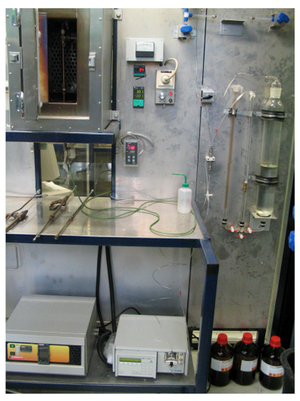
Catalysts : Ni/Al_2O_3 doped with Mn, Mo, Fe,…



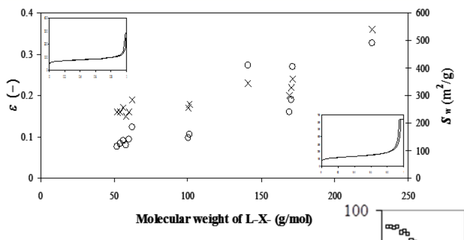


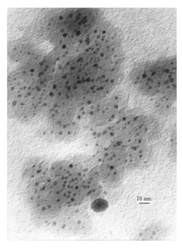
XRD spectra

Hydrodechlorination of chlorinated products

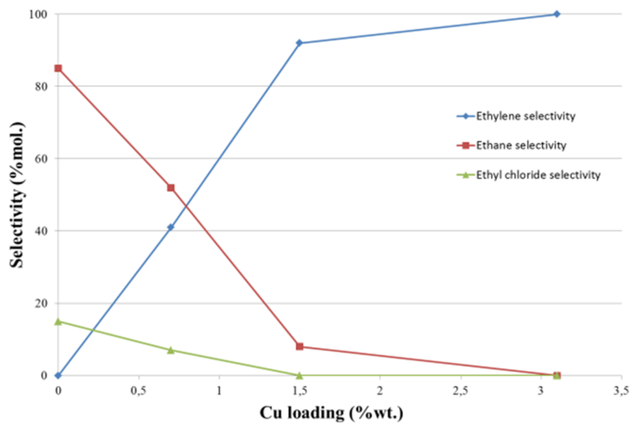


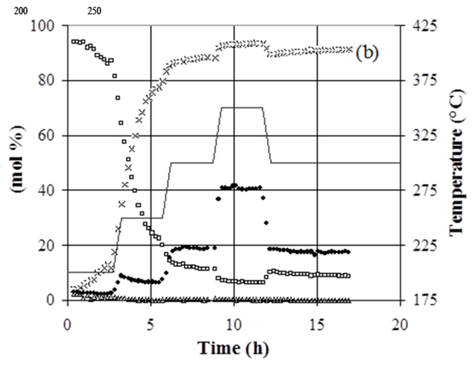
$$CH_2Cl\text{-}CH_2Cl \xrightarrow{+H_2,\ -HCl} CH_2{=}CH_2,\ CH_3\text{-}CH_3,\ CH_3\text{-}CH_2Cl$$





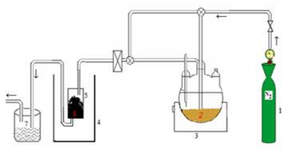
Ni-Cu/SiO_2



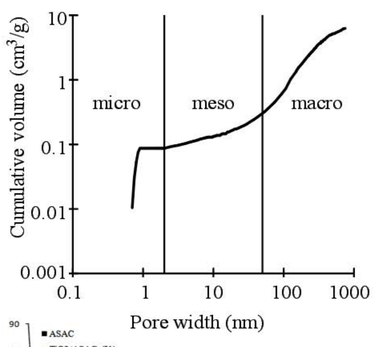


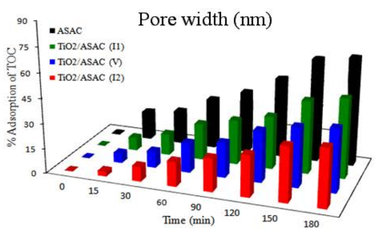
Ni50-Cu50 sample. (●) $ClCH_2\text{-}CH_2Cl$ conversion, (x) C_2H_4 selectivity, (□) C_2H_6 selectivity, (Δ) C_2H_5Cl selectivity, (—) Temperature.

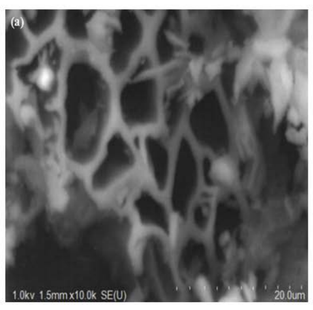
Adsorption and photodegradation of liquid pollutants



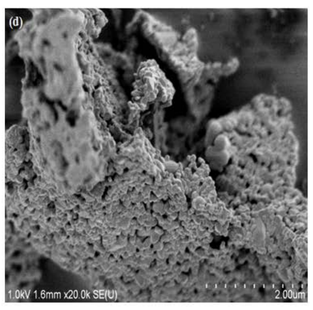
Scheme of experimental setup





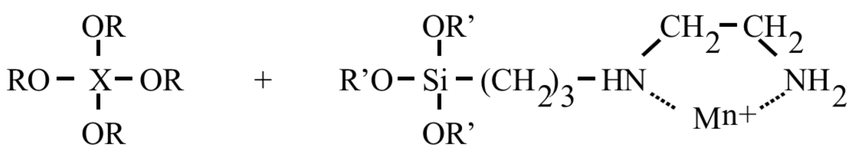


Activated carbon

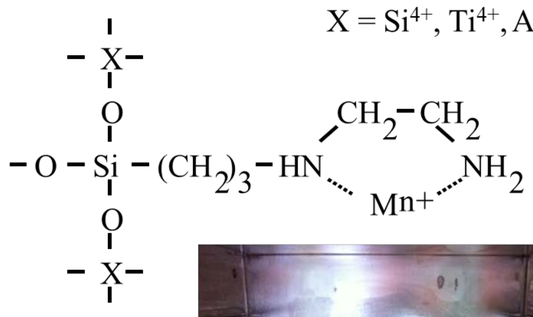


Activated carbon + TiO_2

Sol-Gel Process



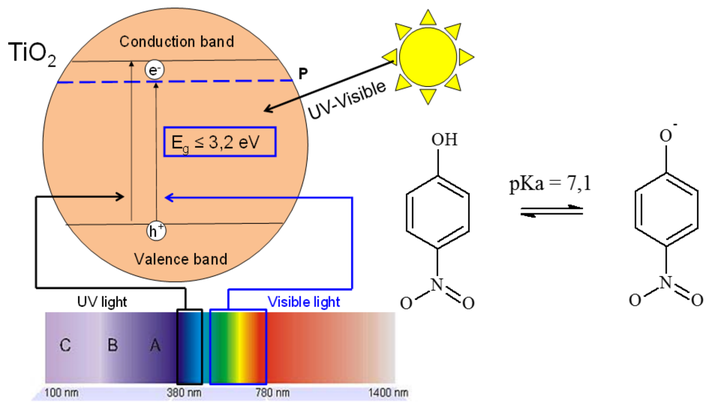
M = Ni, Pd, Pt, Fe,…
X = Si^{4+}, Ti^{4+}, Al^{3+},…



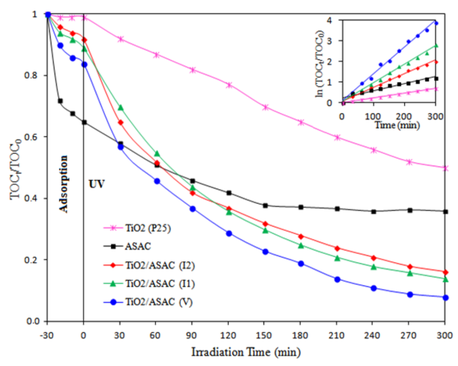
+ H_2O
- ROH
- R'OH

R, R' = $-CH_3$, $-C_2H_5$, …

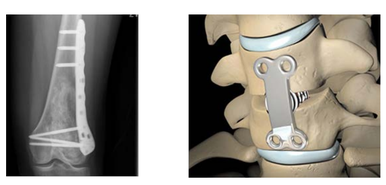
Adsorption and photodegradation of liquid pollutants

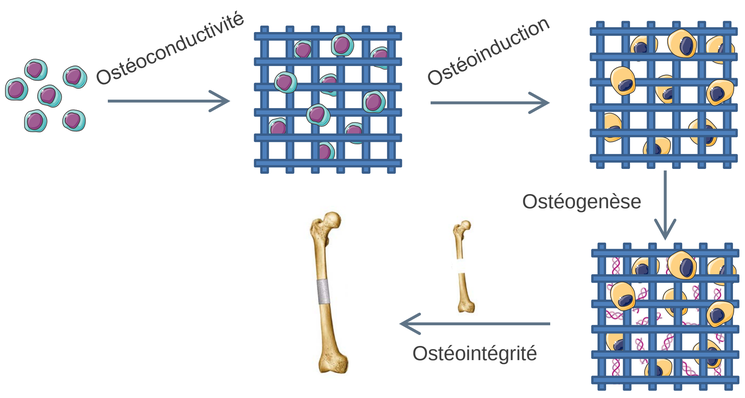


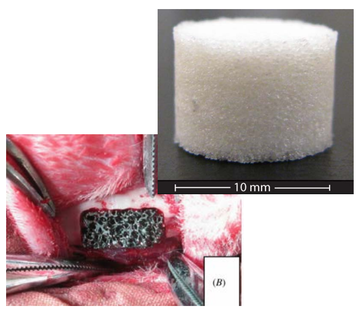
Photocatalytic TOC degradation tests over different samples at 45 °C



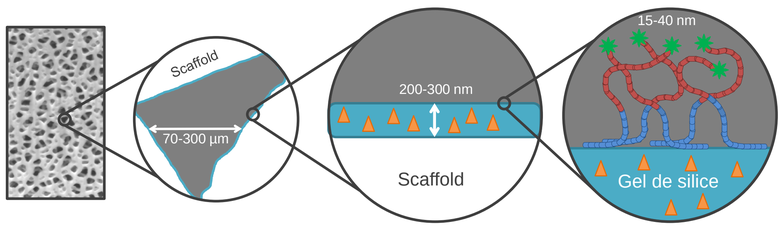
Porous hybrid polymer-ceramic biomaterials for tissue engineering







Surface modification of an inorganic matrix (HA/TCP) to promote cell adhesion and proliferation



Inclusion of growth factors (BMP) in silica gel

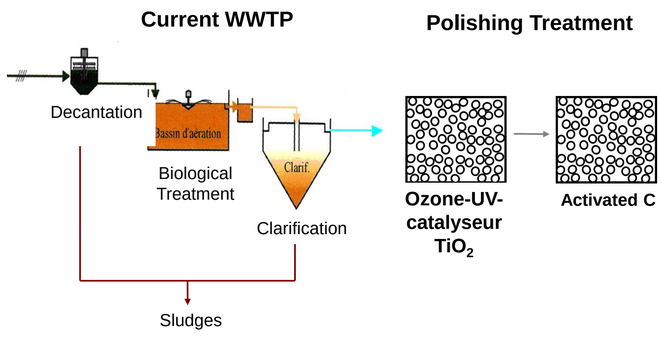
Physisorption of amphiphilic functionnalized polymers

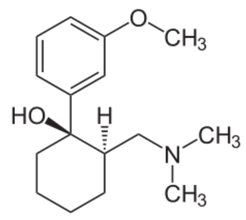
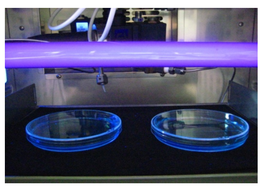
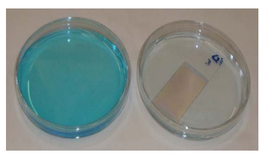
BMP

Peptide

Catalytic oxidation treatments of micropollutants in waste waters

European CORNET project





1,2 kg tramadol/month