# An *in situ* infrared spectroscopy study of organic interactions on γ-alumina surfaces and ternary complexes with Co(II)

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The aim of this study was to investigate organic additives (polyols and polycarboxylates) sorption, for cobalt precursors adsorption, on γ-alumina. *In situ* Attenuated Total Reflectance (ATR) infrared spectroscopy was used for real time analysis of surface adsorption [1-3]. The effect of experimental conditions, as pH, ionic strengh and concentration of organics and cobalt, on adsorption was followed for various additives.

The understanding of the phenomena occurring at the preparation of the catalysts, i.e. the chemical reactions involved at the solid-liquid interface, is the first steps for optimization and development of new catalysts for eco-friendly industrial processes. Moreover, these systems are relevant in a geochemical perspective, since the migration of cations in geosphere is impacted by the presence of small organic ligands.

Our results highlight the different sorption behaviors according to the nature of the solvated species involved, as complexing and non-complexing additives, for the cobalt and organics adsorption on γ-alumina surfaces. Complexing additives, as citrate and NTA, leads to an improve of Co adsorption with the formation of ternary inner-sphere complex, while acetate (non-complexing additive) has no impact on cobalt sorption during the impregnation.

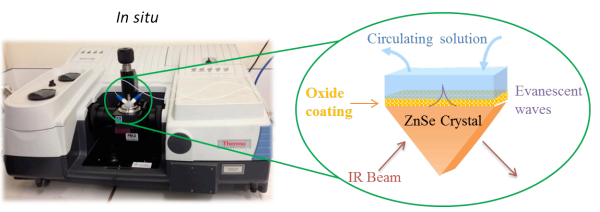


**Figure 1:** *In situ* ATR-FTIR spectroscopy

[1] Lefèvre (2004) *Adv. Colloid Interface Sci.* **107**, 109-123.
[2] Davantès et al (2015) *J. Phys. Chem. C* **119**, 12356-12364.
[3] Davantès & Lefèvre (2015) *Eur. Phys. J. Special Topics* **224**, 1977-1983.

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