

International Master 2 Atmospheric Sciences: Research Training 2021-2022

Laboratory: CERI EE (IMT Lille Douai)

Supervisor: Frédéric THEVENET, Manolis ROMANIAS, Marie VERRIELE

Tél : 03.27.71.26.13, E-mail : emmanouil.romanias@imt-lille-douai.fr;
frederic.thevenet@imt-lille-douai.fr; marie.verriele@imt-lille-douai.fr

Collaborator: Saint Gobain Recherche
Eventually,

CaPPA Work Package: WP2. Aerosol microphysical, chemical and optical properties from fundamental heterogeneous processes to remote sensing

Conversion of formaldehyde on cementitious urban surfaces : impact on air quality

Cement and mortar surfaces are ubiquitous in urban environments, outdoor and indoor. They provide large platforms for uptake and for reaction of gas phase species. Due to the composition of cement and mortar based materials; strong surface basic sites are available. Recent studies carried out at IMT Lille Douai, CERI EE, evidenced a major reaction pathway between formaldehyde and basic surface sites of mortars, with various side-products formed in the gas phase and in the adsorbed phase.

The experimental objective of this internship is to investigate the uptake and the reactivity of formaldehyde on typical cementitious surfaces in order to address the kinetic of formaldehyde consumption and side product formation. A special attention is paid to (i) the release of gas phase products, (ii) the coverage of the materials of interest by surface side-products, and (iii) the evaluation of the long-term behavior of the reaction. This internship aims at evaluating the possible impact of such heterogeneous atmospheric process on air quality.

This internship is highly oriented towards experimental work. It will be carried out at IMT Lille Douai, CERI EE, using state of the art uptake reactors to simulate realistic environmental conditions to ensure the applicability of the results. Reactors will be coupled the most recent analytical instrumentation (SIFT-MS, HCHO analyzer, FTIR) to monitor, in real-time, both reactants and products in the gas phase and in the adsorbed phase.

Key words: formaldehyde; cement; mortar; air quality