

International Master 2 Atmospheric Sciences: Research Training 2020-2021

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Eventually,

CaPPA Work Package: WP-2 Aerosol properties

pH microenvironment sensing in single aerosols

Atmospheric particles are generally complex mixtures. Sea salts and mineral dust are the two main mass source of aerosols in the troposphere. However, organic compounds, sulfates, nitrates, ammonium, soot, etc. are also present in aerosols. During their stay in the atmosphere, aerosols are subject to physicochemical transformations that affect the atmospheric chemistry and climate changes. Studying the properties of aerosols at the single particle scale is an added value to better understand the physical-chemical mechanisms intervening in heterogeneous atmospheric processes since these processes are complex and still remain unresolved.

The objective of this master project is to study the pH of aerosol models at the single particle scale. Sensing of pH microenvironment in single aerosols is of vital importance for understanding microscale reactions because pH controls several physicochemical processes such as reaction rates, solubility, phase transitions, heterogeneous chemistry etc. In addition, pH can affect human health and climate.^{1,2}

To undertake such study, the student will have access to original approaches combining micro-reactors with spectroscopic and imaging techniques to monitor *in-situ* the pH of single droplets during physicochemical processes^{3,4} as well as to study composition, structure and morphology of the particles.

Key words: pH sensing, single particles, spectroscopy, reactivity

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