

# Elemental Characterization and Speciation

*Miguel A. Reis*

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The Elemental Characterization and Speciation Group of the LFI (CEEFI) was born in 2003 in the sequence of a small reorganization of activities using the 2.5 MV Van de Graaff accelerator of ITN, namely in what concerns activities previously in the framework of the Atmospheric Elemental Dispersion (DEA) unit. CEEFI carries out work of research, development and application of ion beam based nuclear analytical techniques for the characterization of samples elemental composition, aiming also at speciation methodologies. So far, the main focus is put on particle induced x-ray emission (PIXE) and airborne material. Atmospheric environment related samples like airborne particulate matter and/or biomonitoring samples are different faces of this focus. A widen of this focus is presently being undertaken in order to cover a broader but more concise focus on small mass samples as particulate like and/or thin film samples.

In complementary lines of work, the group assumes that it is important not to depend exclusively on collaborations neither for sampling nor for data handling processes. Therefore, R&D is carried out on airborne particles sampling and on data handling methods, both for spectra handling and for aerosol and biomonitor multielementar data analysis.

Taking into account that PIXE is already a matured analytical technique, services are provided to both the community in general, and the scientific community in

particular. In this last case, the analysis of samples other than environmental is carried out, and case studies do sometimes lead to spin offs associated to details or specific developments of the PIXE technique.

Within the organics of the Ion Beam Laboratory (LFI), CEEFI is responsible for the maintenance and improvement of the PIXE line, assuring that (at least) there are no losses on the installed capacity.

In 2004, the groups' activities have been structured on three main blocs: (a) PIXE analysis of airborne particulate matter; (b) development and application of new analytical methodologies, namely for thin film characterization; (c) proceeding with the work program of the Laboratory for Characterization and Speciation of Aerosols (LCEA) up to now within the limits of budget limited to the auto-financing share (the proposal for funding was approved during 2004 but will only have effects starting on 2005).

Within item (c), durring 2004 it was possible to: confirm results obtained at ITN by using a high resolution spectrometer within a cooperation program, start a PhD program in the speciation methodology subject, and start the development of existing home made software to adapt it to new requirements that will be faced once the HRPIXE system from the LCEA program is installed.

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## Research Team

### Researchers

- M.A. REIS, Aux. Researcher, Group leader

### Students

- P.C. CHAVES, PhD student
- N. ALEIXO, Graduation work
- S. ALEIXO, Graduation work

### Technical Personnel

- R. PINHEIRO, Technician (partial)

## Funding (€)

Research Projects:	4.000,00
Services:	17.662,92
<b>Total:</b>	<b>21.662,92</b>

## Publications

Books:	0
Journals:	2 and 2 in press
Proceedings:	4
Conf. Communications:	1
Other publications:	2
Theses:	0