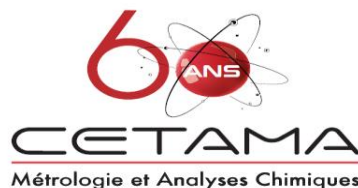


The logo for CEA (Commissariat à l'énergie atomique et aux énergies alternatives) features the lowercase letters 'cea' in white on a red background, with a horizontal line below the letters.The logo for INSIDER consists of a small colorful icon followed by the word 'INSIDER' in a bold, sans-serif font.The logo for CETAMA (Commissariat à l'énergie atomique et aux énergies alternatives - Métrologie et Analyses Chimiques) features a large '60' with 'ANS' inside the zero, a stylized atomic symbol, and the text 'CETAMA' and 'Métrologie et Analyses Chimiques' below.

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## Primary methods for chemical analysis and their applications at LNE

Paola Fiscaro

Biomedical and inorganic chemistry department, Laboratoire national de métrologie et d'essais  
Paola.fiscaro@lne.fr

LNE is the French National Metrology Institute and its mission is to develop and maintain the national measurement standards. In the field of chemistry, the main activities are in the fields of biomedical and environmental analyses.

This presentation will focus on two applications in the field of environment.

The first case shows the production of a certified reference material for airborne particulate matter on filters. This CRM is certified for the mass fraction of four regulated metals and have been characterized by the use of isotope dilution ICPMS, recognized as a potentially primary method by the BIPM CCQM (Bureau International de Poids et Mesures – Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology). This CRM aims to support the implementation of the Directive 2008/50/EC on ambient air quality and cleaner air for Europe.

The second case shows the ongoing research to demonstrate the applicability of the primary pH calibration system, which the national standard for pH measurements, to measure seawater acidity. This will contribute to the efforts of the international oceanographic community to observe and understand the ocean acidification, which is a phenomenon strictly linked with climate change. In fact, the ocean absorbs up to 30% of atmospheric CO<sub>2</sub>, but this induces an increase of its acidity. Nowadays, oceanographers are used to measure pH<sub>T</sub>, which differs from pH and does not have a well-defined metrological traceability. The use of the pH primary system would allow to produce reference materials for pH<sub>T</sub> values with an established traceability to an internationally recognized measurement standard.