

How to Establish a New Technique as a Standard: The Case of Total Reflection X-ray Fluorescence

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The development of new standards is necessary to diffuse assessed measurement methods through the largest community of users. Up to now, there is not any standardized procedure for the use of total reflection X-ray fluorescence (TXRF) in environmental and biological analysis.

TXRF is a powerful technique for qualitative and quantitative elemental analysis of several types of samples. Suitable sample preparation and analysis procedures are required to obtain accurate results. For this reason, strong international effort and cooperation of experts is particularly useful in pre-normative research, where results lead to the development and establishment of protocols and methods.

Inter-laboratory studies are required for the validation of specific analytical methods that will be proposed as standards, and to understand, in a real approximation, the sources of measurement uncertainty. In the last ten years there has been an increasing number of participations in such tests, in particular of the Growing Economies Countries. Indeed, these collaborative studies are a unique opportunity of sharing the knowledge and assessing the protocols thus improving worldwide laboratories performances. National metrology institutes, standards organizations, metrology tool suppliers and the academic community cooperate on improvements of methods and definition of reference materials. In this frame, VAMAS (Versailles Project on Advanced Materials and Standards) is one of the most active international association coordinating international collaborative projects. These projects in many cases led to the development of documents for the international standard organization (ISO).

A project titled "Inter-laboratory comparison of total-reflection X-ray fluorescence spectroscopy for environmental analysis" started in 2010 in the frame of VAMAS Technical Working Area 2 - Surface chemical analysis. The project aim is the development of guidelines and standard methodologies for biological and environmental analysis by means of TXRF. Part of this pre-normative research work, was dedicated to draft the Technical Specification document titled "Surface Chemical Analysis -Technical Specification for the use of Total Reflection X-ray Fluorescence spectroscopy in biological and environmental analysis" published in 2015 as ISO TS 18507. This document lays the basis for the development of further specific standards dedicated to TXRF analysis of selected samples. The first one, NP 20289, is dedicated to TXRF analysis of water, is under development. Many others have been proposed and they are still under evaluation.