

## **ELEMENTAL ANALYSIS OF FRESH AND WASTE WATER FROM INDUSTRIAL SOURCES USING TOTAL REFLECTION X-RAY FLOURESCENCE (TXRF) SPECTROSCOPY**

Michael Beauchaine, Bruker AXS Inc., Madison, WI USA

Quantitative elemental analysis of industrial waste water is important for the protection of health and environment and must abide to strict regulations. In this study, TXRF was evaluated as an alternative to AAS and ICP techniques for the quantification of unknown elements and heavy metals in sewage and industrial waste water. Samples were first evaluated for the amount of solids present and filtered or measured directly depending on the amount present in each sample. For quantitative analysis, samples were diluted, homogenized, and pipetted onto a carrier with the use of only one internal standard. Prior to analysis samples were vacuum dried directly onto quartz carriers. For efficiency purposes, each sample was loaded into the instrument's automatic sample changer and analyzed for 1000 seconds each. After analysis, spectra were analyzed qualitatively and quantitatively to determine the concentration of elements, detection limits, and reproducibility for multiple elements within each sample.

Detection limits in the low parts per billion ranges of commonly regulated elements and heavy metals proved that TXRF is comparable, and in many cases, an improvement upon current results achieved by regulatory techniques used within the industry. The added benefits of non-destructive sample analysis, high reproducibility, little sample prep, ease-of-use, and low level of detection associated with the TXRF analytical technique make this a viable tool for elemental analysis of water and industrial effluents from a variety of sources.