

## MERCURY EMISSIONS MONITORING BY TXRF

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UHV Technologies, Inc. has developed a TXRF technology to collect and measure trace amounts of mercury emitted from electricity generating units at concentrations in  $\text{ng}/\text{m}^3$  in a continuous manner. This TXRF technology has been developed as a low-cost solution over existing Mercury continuous emission monitors (CEMs) in order to control Mercury remediation materials and equipment to minimize operating costs.

Existing Mercury CEMs currently utilize cold vapor atomic fluorescence (CVAF) or cold vapor atomic absorption spectroscopy (CVAF) to measure vapor phase Mercury at EGUs. UHV has developed a novel low cost TXRF technology for this type of mercury measurement.

The key aspect of this technology was the development of a novel nanosensor to collect the mercury from the vapor phase. This nanosensor is fabricated on a tape which is loaded into the TXRF instrument. As the vapor phase mercury flows across the surface of the tape, it is collected as the tape moves across the analysis region of the TXRF instrument. The nanosensor is used both as a device for the collection of mercury and also as an internal calibration standard used to maintain the high degree of accuracy for the instrument. This sensor was developed to withstand gases which would possibly interfere with the mercury collection process such as sulfur dioxide, carbon dioxide, oxygen, nitrogen dioxide, and nitrous oxide. Additionally, gaseous conditions such as the effect of temperature and moisture were measured to determine the effects of mercury collection on mercury collection.



The TXRF Hg CEM is designed to be a small standalone instrument approximately 12" x 12" x 18" and is controlled wirelessly or with a touch screen interface. Flue samples are to be delivered from the EGU to the TXRF instrument where a nanosensor collects the mercury in a continuous fashion. The TXRF hardware then analyzes the nanosensor for the amount of mercury present as it correlates the volume of gas sampled to the mass of mercury detected on the nanosensor. In this paper, we will present our efforts on the development of a TXRF Vapor Phase Mercury Continuous Emission Monitor for use in coal fire power plants and other EGUs.

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