

# Energy-dispersive X-ray Fluorescence method for Determination of Gold and Silver in Jewellery

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## ABSTRACT

For refiners, recyclers, and analytical assay labs alike, the price of gold and silver in today's market requires information that is delivered quickly, as well as with high accuracy. X-ray fluorescence (XRF) analyzers present a cost-effective, efficient, accurate and precise solution, and offer a number of unique benefits like measurement times ranging from 2 to 15 seconds; 100 % non-destructive analysis; complete alloy composition, simultaneous multi-element analysis; easy-to-use; does not require a highly-skilled operator. A highly economical tool compared to the cost of fire assay. While not a total replacement for fire assay for most gold refiners, an XRF analyzer can significantly increase speed and efficiency in a gold and silver recycling or refining facility. The results from a study signify the real scope of energy dispersive XRF in the analysis of precious metal samples prior to their hallmarking are presented. The advantages and limitations of this technique are reported for the analysis of gold and silver jewellery samples, which is one of the most significant industrial activities in Ahmedabad. The results of gold and silver support the use of this technique in Assay Offices, not only for screening purposes, but also as an alternative to cupellation and potentiometric titration for a number of samples. The application of the energy-dispersive XRF spectrometer for the detection of plating layers like rhodium and nickel is also discussed.