

APPLICATION NOTE

Precious metal analysis via X-ray fluorescence for assaying offices and precious metals refineries

For assayers and refiners of precious metals, material analysis instruments must fulfil exacting requirements. Just determining the precise gold content is not enough: It is important to ascertain the complete composition of the alloy, including elements like platinum or silver. In addition to reliably generating comprehensive, accurate, and reproducible results, the ideal analysis procedure should also be fast, easy to use, and – of course! – non-destructive.

Fire assaying (cupellation) is the traditional method for determining gold content, whether for gold bars, coins or valuable jewellery. However, serious handling issues outweigh this method's good precision, as it is time consuming, requires the use of acids and, worst of all, damages the item in the process.



Fig. 1: FISCHERSCOPE® X-RAY XAN® 250 provides the highest precision in precious metal analysis.

Fortunately, the well-established X-ray fluorescence method (XRF) provides an excellent alternative for analysing the content of precious metals – without damaging the object. FISCHER's high-end XRF instrument, the FISCHERSCOPE® X-RAY XAN® 250, is designed especially to determine precious metal content. Providing precision rates of 0.3‰ or better, the XAN 250 can help assayers and refiners significantly reduce the number of cupellation tests required, saving them valuable time and resources.

The XAN 250 both determines the material content and assesses coatings all in one analysis cycle, with extraordinary repeatability: Table 1 shows the results from ten measurements of a 14-carat gold object coated with 400 nm of rhodium, taken specifically to verify the instrument's repeatability precision.

| | Rh [µm] | Au [‰] | Ag [‰] |
|------------------------------|------------|-----------|-----------|
| Mean | 0.402 | 583.3 | 31.02 |
| Standard Deviation | 0.001 | 0.150 | 0.188 |
| Coefficient of Variation [%] | 0.24 | 0.03 | 0.61 |
| Range | 0.003 | 0.518 | 0.550 |

Tab. 1: Repeat measurements of coating thickness and base material composition with the FISCHERSCOPE® X-RAY XAN® 250. Ten readings of 120 seconds each were taken on a rhodium-coated gold sample.

At the same time, further measurement tasks can be covered like determination of the exact content of platinum or testing for the presence of prohibited elements such as Ni, Cd or others.

XAN 250's new silicon-drift-detector combines with advanced electronics and FISCHER's superior analytical software, WinFTM®, to give exceptional performance. And whatever the task at hand, interchangeable filters and collimators (for variously sized measurement spots) are available for truly perfect, flexible instrument set-up.

FISCHERSCOPE® X-RAY XAN® 250 is the leading-edge measurement system for fast and non-destructive precious metal analysis. With its outstanding trueness and superb repeatability precision, the XAN 250's measurement results are comparable to cupellation – but far easier to obtain. Your local contact person for FISCHER products will gladly provide further information.