# ApNotes

SciAps

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Analysis of Platinum, Palladium, and Rhodium with SciAps Handheld XRF

Introduction

More recycling facilities are identifying platinum (Pt), palladium (Pd), and rhodium (Rh) in catalytic converters. These platinum group metals are extremely valuable. PGM are also resilient, making them highly sought-after. Platinum is especially a desired metal for jewelry. Because of their value, recycling these metals from catalytic converters is a growing market and accurate identification is essential.

Handheld X-ray fluorescence analyzers enable recyclers to quickly identify Pt, Pd, and Rh in catalytic converters. Within each catalytic converter's core is an internal ceramic, or sometimes metallic, honeycomb structure with a washcoat containing these metals. Handheld XRF allows for efficient and accurate measurements of Pt, Pd, and Rh for price calculation within seconds.

Specifically, the SciAps X-50 is a unique, lower-priced model featuring an X-ray tube that can run up to 50kV. It performs well and is a perfect fit for PGM analysis.
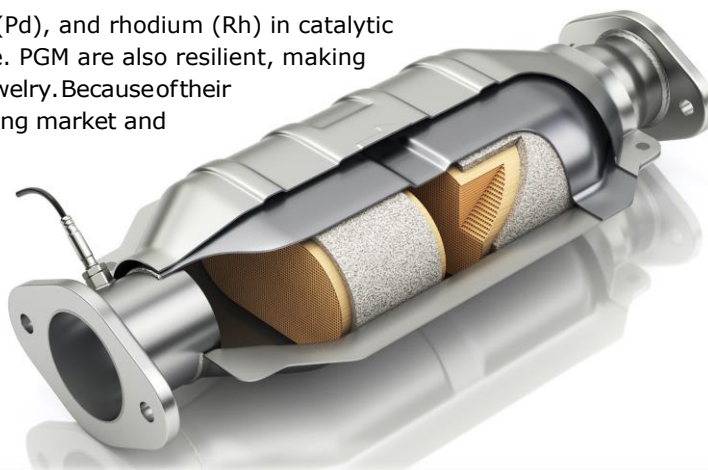
Data and Discussion

In order to evaluate the SciAps X-50 analyzer's capability to accurately measure Pt, Pd and Rh in catalytic converters, a series of real-world samples were prepared and analyzed with 60-second test times.

For recyclers to price the recovered material correctly, it is recommended for the catalytic convertors to be ground, sieved, and homogenized before elemental composition analysis for the most accurate and representative results. In this study, thirteen prepared catalytic converter samples were transferred to cups and analyzed by the X-50 using a dedicated Car Cats calibration. Results for PGM were compared to laboratory assays. The X-50 performed quite well compared to the lab, with a R2 values for all three elements greater than 0.99. The X-50 results can be seen at right.

In addition to the PGM elements measured the X-50 measures several other

Car Cats CRMs (ppm)						
Sample ID	Pd	Pd Lab Assay	Pt	Pt Lab Assay	Rh	Rh Lab Assay
SCC-1	688	697	1059	1120	214	221
SCC-2	678	645	1457	1523	216	220
SCC-3	1226	1212	435	444	203	212
SCC-4	600	544	1343	1414	223	221
SCC-5	630	617	1219	1251	223	220
SCC-6	596	585	1232	1266	239	240
SCC-7	1122	1160	1116	1151	215	232
SCC-8	668	625	1715	1772	222	220
SCC-9	1120	1154	847	785	200	202
SCC-10	1077	1052	1039	1046	213	220
SCC-11	508	561	208	240	70	90
SCC-12	1222	1320	675	740	256	284
SCC-13	1743	1804	1372	1451	200	214

critical elements that are indicative of the honeycomb matrix and washcoat, allowing for a more complete analysis and improved accuracy overall. For example, by identifying the honeycomb type, ceramic versus metallic, the X-50 can more accurately account for matrix effects that can cause bias in the measurement of the key precious metals.

In addition, the X-50 uses a 50kV excitation voltage. This allows for better analysis of other heavy elements that are often found in these samples, such as Ba, Ce and La. These elements can play an important role in matrix effects of the XRF analysis, so measuring and accounting for them can be critical to achieving accurate results for the precious metals.

Summary

A natural choice for the recycling industry, SciAps XRF handheld X-ray fluorescence analyzers deliver accurate, on-the-spot data for a range of materials, including PGM.

Given the chemistry data required, the SciAps X-50 is a unique, lower-priced model featuring an X-ray tube that can run up to 50kV. It is an excellent tool for quick determination of the presence of Pt, Pd, and Rh, as well as other critical elements, in car catalytic converters.

Using the SciAps X-50 makes recycling these valuable metals more profitable, and provides a cost-effective solution for recovery in the precious metals industry – cash for gold, pawn shops, investment, and many others.

Platinum

$y = 0.9648x$
$R^2 = 0.9938$

Palladium

$y = 0.9827x$
$R^2 = 0.9862$

Rhodium

$y = 0.9652x$
$R^2 = 0.9513$

Recommended field portable Grinding and sample preparation kits are also available from us :
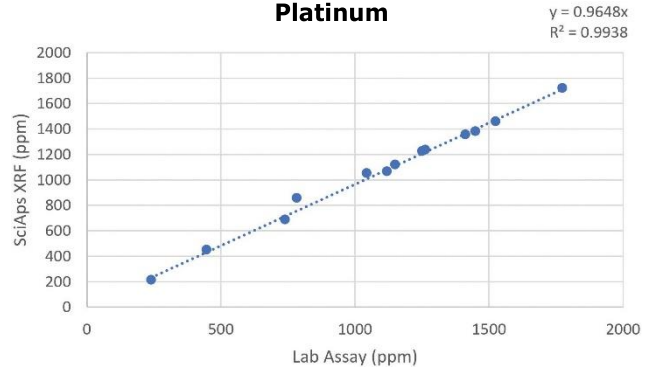
BEST IN CLASS

SciAps X Series is developed and built by experienced industry professionals who have been in the business of handheld XRF from the beginning. The series features options of anode choice and carefully selected element suites that deliver industry-leading analytical performance, combined with a flexible and intuitive Android user interface.
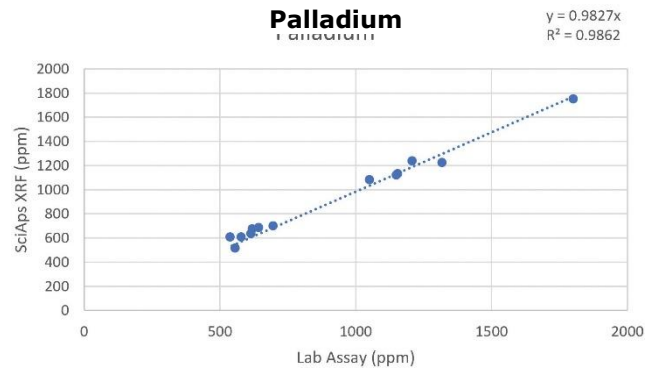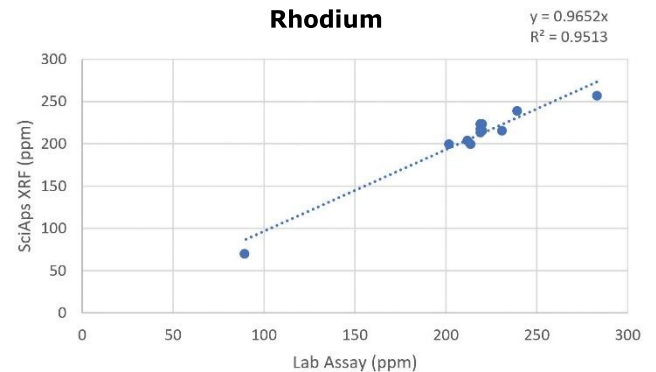
XRF demos at YouTube.com/SciAps

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