

PRECIOUS METAL RECLAMATION

(Assaying and Refining)

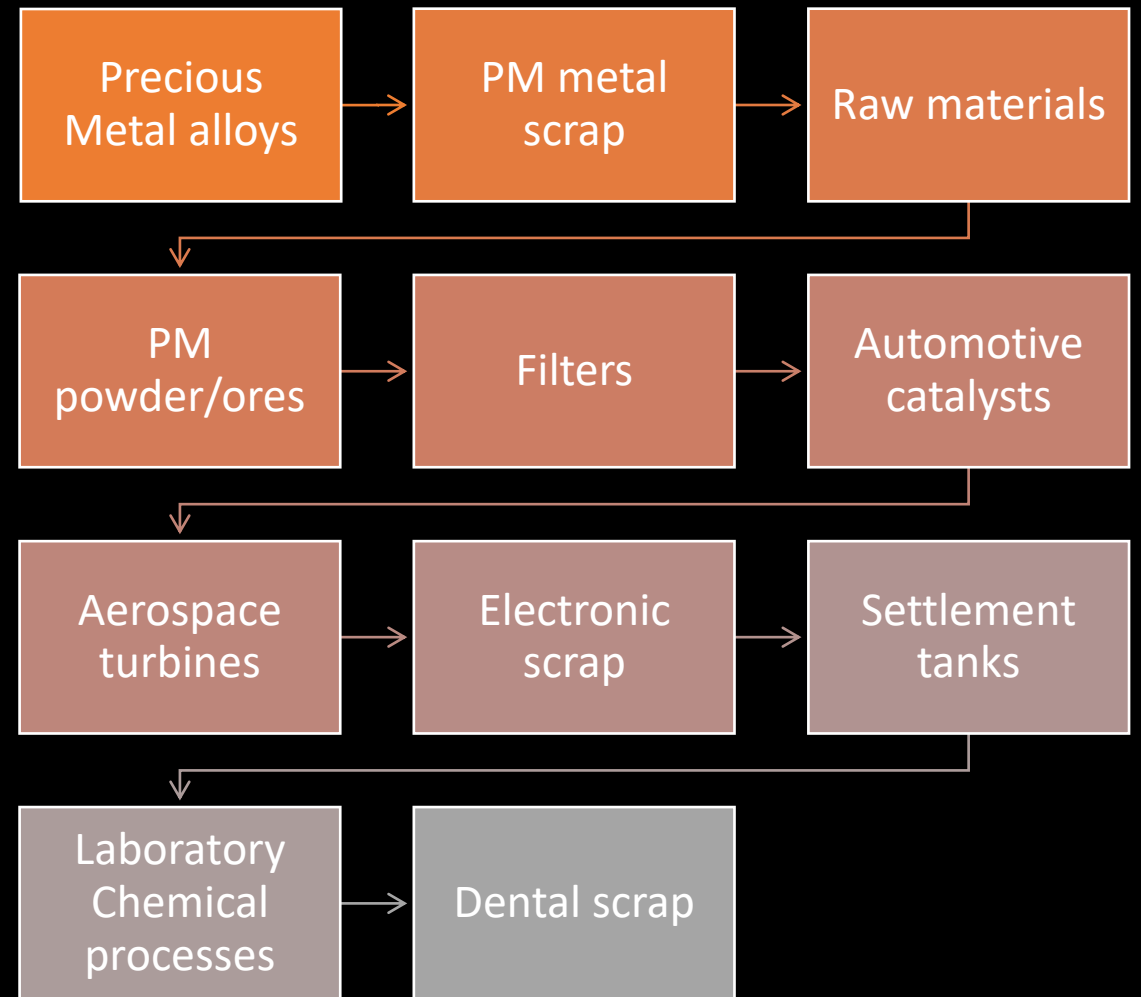
CHRIS WALNE – LAB MANAGER (HATTON GARDEN) MASTERMELT LTD

Noble Metals

A noble metal is a metallic element that resists oxidation or corrosion, even at high temperatures.

44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver
76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold

SOURCE OF MATERIALS TESTED



INDUCTION MELTING



SAMPLE HOMOGENEITY

Au Ag Pd Cu Zn Sn

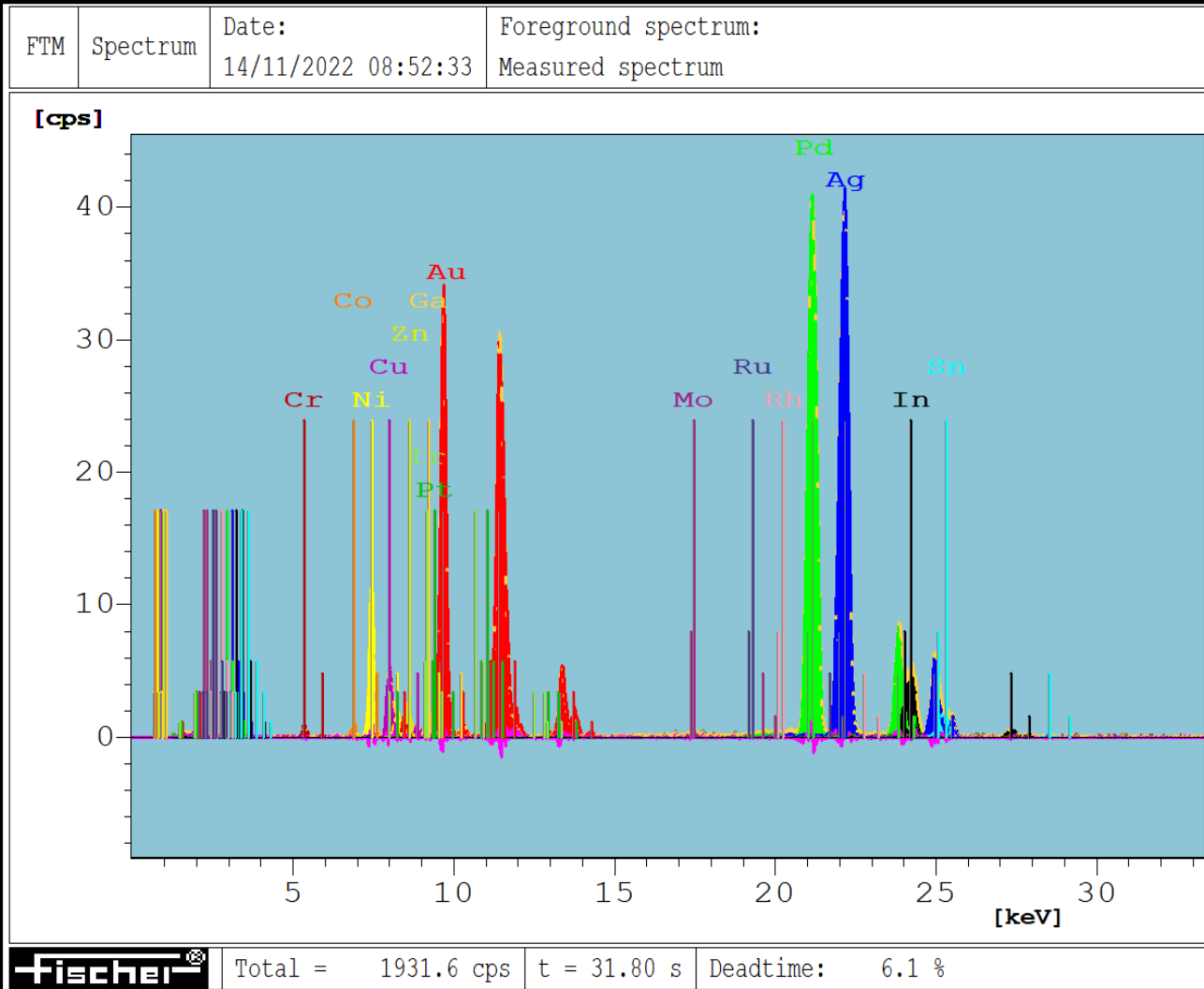
Au Ag Pd Cu

Au Ag Pd Cu Zn Ni

Cr Ni Mo In Co Ga



EDXRF METAL SAMPLE SCREENING



XRAY GOLDSCOPE SD

Au	Ag	Pt	Pd
2.981	2.225	-----	7.954
Cu	Zn	Sn	Pb
59.81	-----	0.634	-----
Fe	Cr	Ni	Mo
0.645	4.256	15.34	0.233
Co	Rh	Ru	In
4.996	-----	-----	0.437
Ir	W	Bi	Mn
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Ga	Cd		
0.486	-----		

Prod. Order No.: PR272895-01

METHODOLOGY (metals)

Gravimetric Fire Assay Cupellation for Au 100-200mg samples:

Au > 30%

Pt <7% Pd <20%

Base metal impurities as stated in ISO 11426

Outside these parameters: (deleterious elements W Ir Rh Ru – Cr Ni Fe Sn Mo)

Add silver 8-10 times total PM content and digest in HNO₃ in order to facilitate the Au breaking up.
Add HCl to digest the PGM's

Solution is washed into appropriate flask (AgCl filtered out) containing 20% HCl matrix and 10ppm Yttrium internal standard.

Analysis by ICP or Microwave Plasma emission 100 ppm top standard.

Powder sample preparation – Thermal decomposition at 650-700 degrees c
Milling – Grinding – Sieving down to 100 microns for test sample.



METHODOLOGY (powders)

- SAMPLE SIZE 1g-3g weighed into porcelain crucibles.
- Mixed into 120g pre-made Pb reducing flux and smelted to collect the PM's. (35-40g Pb button)
- Cupel the Pb button - weigh and XRF the resultant PM bead to determine the rough content.



CONCENTRATION OF Au IN SOLUTION

SAMPLE WEIGHT = 1.0055g

XRF BEAD WEIGHT = 0.0424g

Au XRF ANALYSIS of bead = 26.86%

Approximate Au content in sample = $(0.2686 \times 0.0424) / 1.0055 \times 100 = 1.13\%$

Au CONCENTRATION IN SOLUTION = $0.2686 \times 0.0424 = 0.011\text{g}$ or 11mg

11mg in 250ml flask = 44ppm Au

RAW MATERIAL TO REAL MONEY

- COLLECTION – TREATMENT – ANALYSIS - SETTLEMENT
- 50kg material ~ 0.5% Au content = 250g fine Approx. £11,800



Thankyou for your attention

