Zimlabs "When Accuracy Matters!"

Which Assay Method to Choose for your Geological Samples?

Presentation to the Geological Society Summer Symposium

26 November 2021

Presentation Outline

- About Zimlabs
- Assay methods for Gold
- Analysis methods for base metals
- Questions

About Zimlabs

- GNK Laboratories t/a Zimlabs
- Over 19 years in the laboratory testing business
- ISO 17025 accredited since 2009
- Capacity to handle large volumes of samples
- Qualified personnel
- Services- Agriculture, Mining, Food & Water
- Faster turnaround times, Competitive prices

Zimlabs Team

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Which Assay Method?

Assay Method

1. Choice of Assay method dependent on:

- The type of mineral or element of interest
- Type of sample
- Accuracy & Precision required
- Cost
- Requirements of exploration program (detection limits & samples size

Gold Assay Methods

- Variety of methods used in analysis of Au
- These include:

✓ Inductively Coupled Plasma emission spectroscopy (ICP-ES) and ICP-MS

✓ Atomic Absorption spectroscopy (AAS)

✓ Graphite furnace AAS

✓ Neutron activation analysis (NAA)

✓ Laser ablation ICP MS- femtosecond laser ablation analysis in Au fire assay button

Gold Assay Methods

- For Au there are several extraction methods from various geological matrices
- These include:

✓ Fire assay

✓ Aqua regia

✓ Cyanide leach

✓ Activated carbon microextraction

✓ Cloud point extraction

Gold Assay methods

- Two major sub-type of fire assay which are Pb and NiS
- NiS-FA useful where all the PGM are required in addition to Au
- Where Au only is required the method has lower recoveries compared to Pb-FA
- The Pb- FA offers complete digestion

Aqua Regia

- Sample subjected to attack by mixture of conc HCl and HNO3
- Mainly used in soil, sediment and rock as partial digestion
- Offers lower detection limits compared to Pb-FA
- Faster than Pb- FA
- Small sample sizes can be used

Fire Assay or Aqua regia?

- For soil samples- aqua regia is the best,
- for rocks, drill core fire assay is the best (able to liberate all the gold)

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Base Metals

- Variety of methods used in analysis of Base Metals
- These include:

✓ Inductively Coupled Plasma emission spectroscopy (ICP-ES) and ICP-MS

✓ Atomic Absorption spectroscopy (AAS)

✓ Non destructive methods

✓ Titrations

Base Metals

- Variety of methods used in extraction of Base Metals
- These include:

✓ Acid Digestion- Aqua Regia & Four acid

✓ Fusion – peroxide and borate

✓ XRF

Base Metals

Concentration	Method	Type of sample
ppm – Low %	ICP- AES AAS	Rocks, soils & ores
Low %	XRF	Ores and metal products
High %	Classical methods	Concentrates, high value ores, metals

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Thank you