

Gold

Fire Assay Fusion

For quantitative analysis of gold, the fire assay procedure is still the preferred choice globally. However, it should also be recognized that a wide variety of minerals and metals such as chromite, base metal sulfides and oxides, selenides and tellurides in moderate to high concentrations, can interfere with the fire assay process, generally leading to low precious metal recoveries. With prior knowledge of the presence of these minerals and metals, ALS Minerals can modify flux constituents and increase flux to sample ratios to improve recoveries. In most cases, a reduction in sample weight will yield higher precious metal recoveries, particularly in the presence of the interfering species mentioned above. For optimum gold and PGE recoveries for most sample matrices, ALS Minerals recommends a 30g maximum charge weight.

ANALYTE	RANGE (ppm)**	DESCRIPTION	CODE
Trace Level			
Au	0.001-10	Au by fire assay and ICP-AES. 30g nominal sample weight 50g nominal sample weight	Au-ICP21 Au-ICP22
Au	0.002-1	Au by fire assay and AAS. 30g nominal sample weight 50g nominal sample weight	Au-AA21 Au-AA22
Au	0.005-10	Au by fire assay and AAS. 30g nominal sample weight 50g nominal sample weight	Au-AA23 Au-AA24
Ore Grade			
Au	0.01-100	Au by fire assay and AAS. 30g nominal sample weight 50g nominal sample weight	Au-AA25 Au-AA26
Au	0.05-1,000	Au by fire assay and gravimetric finish. 30g nominal sample weight 50g nominal sample weight	Au-GRA21 Au-GRA22
Au Ag	0.05-1,000 5-10,000	Au and Ag by fire assay and gravimetric finish. 30g nominal sample weight 50g nominal sample weight	ME-GRA21 ME-GRA22
Au	0.05-1,000	1 kg.screen fire assay. Screen to 100 micron. Duplicate assay on screen undersize. Assay of entire oversize fraction. 30g nominal sample weight 50g nominal sample weight	Au-SCR21* Au-SCR24*

* Other screen sizes may be available - please contact your local office for details.

** 1 oz/ton = 34.2857 ppm

ANALYTE	RANGE (ppm)*	DESCRIPTION	CODE
Concentrates			
Au	0.07-999,985	Au by fire assay and gravimetric finish. 30g nominal sample weight	Au-CON01
Bullion			
Au	Fineness 0.1-1,000	Routine bullion assays by fire assay with gravimetric finish.	Au-GRA24
Au	Fineness 1-1,000	Au umpire assay in bullion samples by fire assay with gravimetric finish.	Au-UMP20

*At your request, precious metals reporting units can be specified as ppb, ppm, g/t or oz/t (except for bullion assays).

Aqua Regia Gold Digestions and Multi-Elements Determinations

Aqua regia digestion is generally suitable for the determination of gold in soil and stream sediment samples. Where this digestion procedure is used to measure the acid extractable gold contents of rock chips and other more mineralized materials, roasting of samples containing sulfides and/or carbon prior to analysis is recommended. A 15g sample is often sufficient for soils. For stream sediments, the large 50g nominal weight and lower detection limit is recommended.

ANALYTE	RANGE (ppm)	DESCRIPTION	CODE
Super Trace Level			
Au	0.0001-0.1	Au by aqua regia, ICP-MS (MARG). 25g nominal sample weight 50g nominal sample weight	Au-ST43 Au-ST44
Trace Level			
Au	0.001-1	Au by aqua regia extraction with ICP-MS finish. 25g nominal sample weight 50g nominal sample weight 15g nominal sample weight	Au-TL43 Au-TL44 Au-TL42
Ore Grade			
Au	0.01-100	Au by aqua regia extraction with AAS or ICP-MS finish. 25g nominal sample weight 50g nominal sample weight	Au-OG43 Au-OG44
Roasting			
Au		Samples containing sulfidic, calcareous or organic material	RST-21

* Additional acid leachable elements by ICP-AES can be added at a competitive price. See pages 13 and 14 for details.

Adding ME-MS41 to an Aqua Regia Gold Digestion

Many projects require the full multi-element suite from the ME-MS41 (page 13) plus a larger sample size for Au to reduce potential nugget effects and provide the lowest possible detection limit. ME-MS41 can be combined with our Trace Level and Super Trace Level aqua regia gold digestions to provide a larger sample size and the full multi-element information.

A 15g sample is often sufficient for soils. For stream sediments the large 50g nominal weight and lower detection limit is recommended.

ANALYTE	RANGE (ppm)	DESCRIPTION	CODE
Au + ME-MS41	0.0001-0.1	Au by Aqua Regia with ICP-MS finish + MS-MS41 25g nominal weight 50g nominal weight	ST43-PKG ST44-PKG
	0.001-1	Au by Aqua Regia with ICP-MS finish + ME-MS41 15g nominal weight 25g nominal weight 50g nominal weight	TL42-PKG TL43-PKG TL44-PKG

Cyanide Leach

Cyanide leach procedures are used in grassroots exploration where cyanide extraction from a very large sample can sometimes detect small gold anomalies that otherwise would go unnoticed. In mine development and exploration, this procedure can be used to establish the potential gold cyanide extraction efficiency.

ANALYTE	RANGE (ppm)	DESCRIPTION	CODE
Super Trace Level			
Au	0.0001-10	BLEG Au-cyanide leach with ICP-MS finish. 1,000g nominal sample weight	Au-CN12*
Au	0.0001-10	BLEG Au-cyanide leach with extraction AA finish. 1,000g nominal sample weight	Au-AA12*
Trace Level			
Au	0.001-10	BLEG Au-cyanide leach with ICP-MS finish. 500g nominal sample weight	Au-CN11*
Au	0.001-10	BLEG Au-cyanide leach with extraction AA finish. 500g nominal sample weight	Au-AA11*
Ore Grade			
Au	0.03-50	Au by cyanide leach with AAS finish. 30g nominal sample weight	Au-AA13*
Au	0.01-200	Au by cyanide leach with AAS finish. 1,000g nominal sample weight	Au-AA14*
Au	0.01-300	Au by accelerated cyanide leach using LeachWELL™ reagent with AAS finish. 500-3,000g nominal sample weight	Au-AA15
*The following additional elements can be reported on request at additional cost.			
Ag (0.001), Cu (0.01), Pd (0.001) on method Au-CN12			
Ag (0.001), Cu (0.01), Pd (0.001) on method Au-CN11			
Ag (0.03), Cu (0.1) on method Au-AA13			

Note: Cyanide disposal fees applicable in some countries

Metallurgical Samples

ANALYTE	RANGE (ppm)	DESCRIPTION	CODE
Au	0.01-50	Au in cyanide liquor by extraction with AA finish.	Au-AA16
Note: A full range of minor and trace elements can be determined on cyanide liquors by ICP-AES/ICP-MS. Please enquire for details.			
Au	1-10,000	Au on carbon by ashing, aqua regia digestion and AAS. Duplicate analysis.	Au-AA44
Note: A range of elements can be determined on the ashed carbon by ICP-AES/ICP-MS. Please enquire for full details.			