

## ULTRAFINE METHOD DESCRIPTION STATEMENTS AND QC INFORMATION May 2022



The UltraFine+ method is an analytical process flow developed by CSIRO and LabWest. The technique delivers multielement analysis, clay mineralogy and distribution along with related parameters.

### A novel approach and sensitive tool for mineral exploration through cover

#### REFERENCE

Noble R, Lau I, Anand R & Pinchand T (2018): **MRIWA M462 Report** Multi-scaled near surface exploration using ultrafine soils. v2. CSIRO. Data Collection. <https://doi.org/10.25919/5d1058f8b05fc>

#### Process Description: UFF+

1. The <2µm fraction is separated from the submitted soil or regolith sample. This is achieved by settling, using water and a dispersant.
2. pH and electrical conductivity (EC) are determined.
3. Particle size distribution (PSD) is measured on the head sample using laser sizing apparatus
4. Clay mineralogy is reported using NIR reflectance spectroscopy.
5. Inorganic carbon is reported using FTIR spectroscopy.
6. The clay fraction is digested in aqua-regia under high pressure and temperature using microwave apparatus.
7. Elemental concentration is determined using a combination of ICP-MS & ICP-OES, using state-of-the-art instruments.

#### Process Description: UFF-PE (50 Elements only, including Au, Pd, Pt)

1. The <2µm fraction is separated from the submitted soil or regolith sample. This is achieved by settling, using water and a dispersant.
2. The clay fraction is digested in aqua-regia under high pressure and temperature using microwave apparatus.
3. Elemental concentration is determined using a combination of ICP-MS & ICP-OES, using state-of-the-art instruments.

#### General Statements:

The technique delivers multielement analysis, mineralogy and several related parameters derived from the ultrafine (< 2 µm) fraction of soil samples.

Concentration of gold and related metals in the ultrafine fraction gives stronger signals, generally well above instrumental detection limits, and increased signal-to-background ratios. Excellent reproducibility means smaller samples can be collected, leading to reduced

sampling and transport costs, and lending itself to extracting significant additional value from historical sample libraries.

LabWest has developed the UltraFine+™ analysis process in conjunction with CSIRO since 2017.

Analysis of the reactive 2-micron clay fraction, with microwave digestion and using the latest low detection level ICPMS technology, has proven to be useful for geologists and geochemists to help see through shallow to moderate cover.

UltraFine+™ is now an established approach to surface exploration analysis using proven geochemical methods to identify sensitive signals at surface.

A range of clients across Australia are now using this innovative and efficient surface analysis, taking advantage of sensitive detection for gold, base metals, rare-earth and lithium exploration.

## Scheme Code Explanation:

<b>UFF-PE</b>	Collection of <2 micron Ultrafine fraction, microwave digest in Aqua Regia, Au + multi-elements
<b>UFF+</b>	Full UltraFine+ package: collection of <2 micron Ultrafine fraction, microwave Digest in Aqua Regia, Au + multi-elements, including, <b>pH, EC, PSD, mineralogy by NIR.</b>
<b>UFF-PER</b>	Collection of <2 micron fraction, Au + multi-elements on Ultrafine fraction, microwave Digest in Aqua Regia, and includes <b>Rare Earth Elements</b>
<b>UFF-PER-MMA</b>	Collection of <2 micron fraction, Au + multi-elements on Ultrafine fraction, and includes <b>Rare Earth Elements (Multi Acid Digest)</b>
<b>UFF+ PER-MMA</b>	Full UltraFine+ package: Au + multi-elements on Ultrafine fraction including collection of <2 micron fraction, <b>pH, EC, PSD, mineralogy by NIR. (Multi Acid Digest Plus REE)</b>

## UltraFine Quality Control and Quality Assurance:

### A. Laboratory QC

Standard QC consists of:

- Each rack of 40 samples will be analysed with:
  - 1 x Reagent blank
  - 2 x In-rack duplicate analysis
  - 2 x Certified Reference Materials
- Unsupported anomalous results may be retested to ensure they are “real” (at the lab’s discretion).

### B. Client-initiated QC

We recommend insertion of the following, at a rate that the client is comfortable with:

- Suitable low-grade, very fine CRMs, such as the following from ORE Research (leave in 10 gram foil packet):
  - OREAS-45f
  - OREAS-260
  - OREAS-262
  - OREAS-20a
- Field duplicates