XRD Technique, Reporting, and Sample Policies

The submission of samples for testing constitutes acknowledgment of the information, sample requirements, and financial responsibility of the submitter which are provided in this document.

Qualitative Analysis:

- Standard analysis provides the identifications of the major and minor phases present in the material.

Quantitative Analysis:

- Quantitative analysis includes a Rietveld refinement to quantify any identified phases and a list of relative percentages of each identified phase.

General Sample requirements:

- Preferred sample quantity is 0.5g or more, but XRD can be performed on as little as ~20mg if needed.
- Samples must be a fine powder or solid material with a flat surface in order to analyze.
- Coarse powders that can be easily ground will be ground with a mortar and pestle prior to analysis.
- Samples that consist of hard materials, such as carbides, that cannot be ground using a mortar and pestle will be ground in a ball mill prior to analysis and a milling fee will apply
- Samples with a high plasticity such as polymers and metals that cannot be ground to a fine powder are not suitable unless they are bulk pieces with a flat surface that can be analyzed (Bulk object must be able to fit into a 40mm diameter circle no thicker than 5mm to fit into a sample holder, larger samples will require an additional setup cost, please contact us for details).
- Samples that are received wet/damp will be dried prior to analysis. If air drying is insufficient, the sample(s) will be oven dried at a suitable temperature and an oven drying fee will be applied. If the sample is damp/wet and temperature sensitive, inform the lab prior to sending to avoid potential issues with improper handling.
- Samples containing oils or organics that cannot be easily dried may require an alcohol wash in order to properly grind and analyze. Additional preparation fees apply for solvent washes.

Technique Limitations:

- The sample must be crystalline in order to identify by XRD. Non-crystalline substances present in a sample cannot be identified, and cannot be accurately accounted for without spiking for amorphous content, which is not included in a standard analysis.
- The lower detection limit of XRD is on the order of 1% for standard scans but may be much higher or lower depending on the sample matrix and compound of interest. This test is not generally used for trace-level analysis.
- The identification of a substance is dependent upon the pattern it produces matching a database entry. Crystalline substances that do not have a database entry or a provided reference will be reported as an “unidentified phase” and cannot be accurately quantified.
- XRD provides crystalline *compound* identification but does not provide *elemental* composition. The technique is subject to a higher degree of identification error if elemental composition is not determined or provided prior to analysis as many elements can be substituted in different compounds that produce similar patterns. XRF or EDS is highly recommended for samples where chemistry cannot be provided to the lab for the limitation of unlikely matches to the XRD patterns.

Please submit your samples with the required documents to the following address:

H&M Analytical Services
1301 Whitehorse Mercerville Road
Suite 101
Hamilton, NJ 08619

https://h-and-m-analytical.com
Tel: +1 609 758 5700
admin@h-and-m-analytical.com