Navas Instruments fusion sample preparation system for XRF with LOI in one single test

It is well known the sample preparation (bead making) for XRF is essential to obtain accurate results in any XRF analyzer, it has been proven in many instances glass bead is the best way to obtain increased accuracy compared to the press pellet method.

Presently the bead making method by fusion furnaces is cumbersome, very much operator involvement and time consuming, it is almost like an experimental method every time since the present bead making by fusion furnaces does not provide any information on the process, this fusion furnaces simply melt the borate and the samples.

There is obviously a need to make the fusion process simple to use, non-operator dependent , faster, cleaner, and most important: repetitive with consistent results.

There has been a lot of work done to standardize this process but with no tools to provide information on the fusion process it has been a trial and error method not very effective.

Navas Instruments (Patent Pending) fusion and LOI system does make bead making for XRF, simple, repetitive, not as much operator dependent and also providing information on the fusion process that can be used by the XRF instrument for simplicity and accuracy.

For those still requiring LOI the conventional way by TGA, Navas Instruments fusion and LOI system can optionally provide software and quartz or ceramic crucibles to perform LOI analysis in the same fusion machine with up to16 samples in a separate cycle than fusion and temperatures to 1150 ºC

Problems Associated With Bead Making

- Crucible cleaning
- Flux moisture and LOI
- Sample lack of homogeneity
- Instrument reliability and cost of ownership
- Power consumption
- Wasted experimental time finding appropriate fusion parameters, never really knowing if they are correct
- Limited capabilities, No data or expansion possible
- Most important: LOI on all the samples as they are fused

1. ## Crucible Cleaning

This is probably one the worst part of the process, every time a sample is fused the crucible has some drops of previous fusion that requires crucible cleaning with citric acid or any other means, time consuming, irrelevant unneeded wasted time, Navas Instruments moldables do eliminate or reduce drastically crucible cleaning, no pouring needed, beads are fused in the moldables, the beads are released out of the moldables leaving moldables clean and ready for next fusion cycle.

2. ## Flux Moisture And Flux LOI

Flux moisture and LOI on the flux due to flux loss of mass during fusion are parameters that will affect results but do you know how much you lose?, Presently the fusion furnace available does not provide any information on these 2 essential parameters. With Navas Instruments fusion system design at fusion time, we take continuous weights of all the moldables during fusion and provide information on flux quality and loss of weight at different time intervals.

3. ## Sample Lack Of Homogeneity

In Navas fusion system this information is very visible by looking at the flux behavior in a computer graph and by looking at the same time the graph created by the LOI in the sample, not possible in a simple furnace.

4. ## Instrument Reliability And Cost Of Ownership

In some fusion furnaces the parts are very weak and fragile, when these parts brake the flux from all the samples will spill all over the furnace perforating anything on its way, furnace ceramics, heating elements, very expensive to replace and exchange, Navas Instruments design does not have these fragile parts.

The present electric furnaces have an expansion and contraction problem with gate opening and closing and a big drop in temperature with a tendency to liberate particles that can contaminate future beads, Navas Instruments design does not have a gate but a small hole-opening in the furnace.

5. ## Power Consumption

Cost of operation of Navas Instruments is rather small (green operation) with only 2 kW of power compared to approximately 6 kW on other furnaces.

6. ## Wasted Experimental Time Finding Appropriate Fusion Parameters

Navas Instruments eliminates the magic out of this process, simply look at the PC screen presentation (graphs) and you know if the beads are properly fused, look at the beads quality for homogeneity and XRF results.

7. ## Expansion Capabilities

Navas Instruments fusion systems with LOI are fully expandable to accommodate to customer actual needs and actual-present budget availability, as more capacity is needed expansion is extremely simple from 2 to 8 beads and from 4 to 16 per batch.

8. ## LOI On All Samples Fused, 2 To 16 Beads In One Single Fusion Cycle

It is obvious the XRF spectrometer needs the LOI value to provide accurate results, with present fusion furnaces this is impossible.
At Navas Instruments fusion system design (Patent Pending) all moldables are monitored for weight loss with an internal precision balance and at the end of each fusion cycle, the LOI values are provided for the XRF instrument, the TGA analyzer normally needed for the LOI analysis is eliminated or only used for checking certain values or to find the moisture value of samples.

Conclusion:

At Navas Instruments we are proud to offer the XRF analyst with a tool that will make instrument operation and calibration simple and effective!!!