

Improvements to the Elemental Analysis of Solids Method through Precision Monitoring, Advanced Fusion and Blank Testing

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ORAL Innovation

Lithium metaborate fusion is the current process used at an Edmonton based industrial laboratory to prepare solid samples for the Elemental Analysis of Solids (EAS) method. Three main improvements have been made to this method. 1) A new fusion monitor was implemented as a rigorous quality control measure for the autofuser instrument. This monitor will ensure the precision of the autofuser and is customized for each crucible. 2) Two new fusion methods were commissioned for use with samples that would potentially damage the expensive platinum crucibles used in the EAS method. These two new methods are sodium peroxide fusion in zirconium crucibles, and lithium nitrate pre-oxidation in the platinum crucibles. Sodium peroxide fusion was shown to be a non-equivalent method to the traditional lithium metaborate fusion, whereas the lithium nitrate pre-oxidation was shown to be equivalent to lithium metaborate fusion. 3) Five method blank sample replicates were used to test every step of the EAS procedure to determine if contaminants were being picked up, and if so, where. The only contaminating species that was observed above the limit of quantitation was cobalt, which averaged a concentration of 22 ppm.