Elemental Scientific

prepFAST: Geo-Chem Fire Assay Precious Metals by ICPOES

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Brief

The prep*FAST* inline autodilution system autocalibrates and autodilutes 50% Aqua Regia samples for the precise and accurate determination of precious metals. Seamless integration of prep*FAST* with ICP software eliminates a hazardous manual dilution step that requires both time and additional reagents/tubes.

Features:

- Autocalibrate from a single stock standard
- Autodilute sample digests (50% acid)
- Automate hazardous labor intensive steps
- Fluoropolymer sample pathway
- High speed analysis (<1 min/sample)
- Reduce cost per analysis
- Routine walk up and analyze solution for ICP and ICPMS

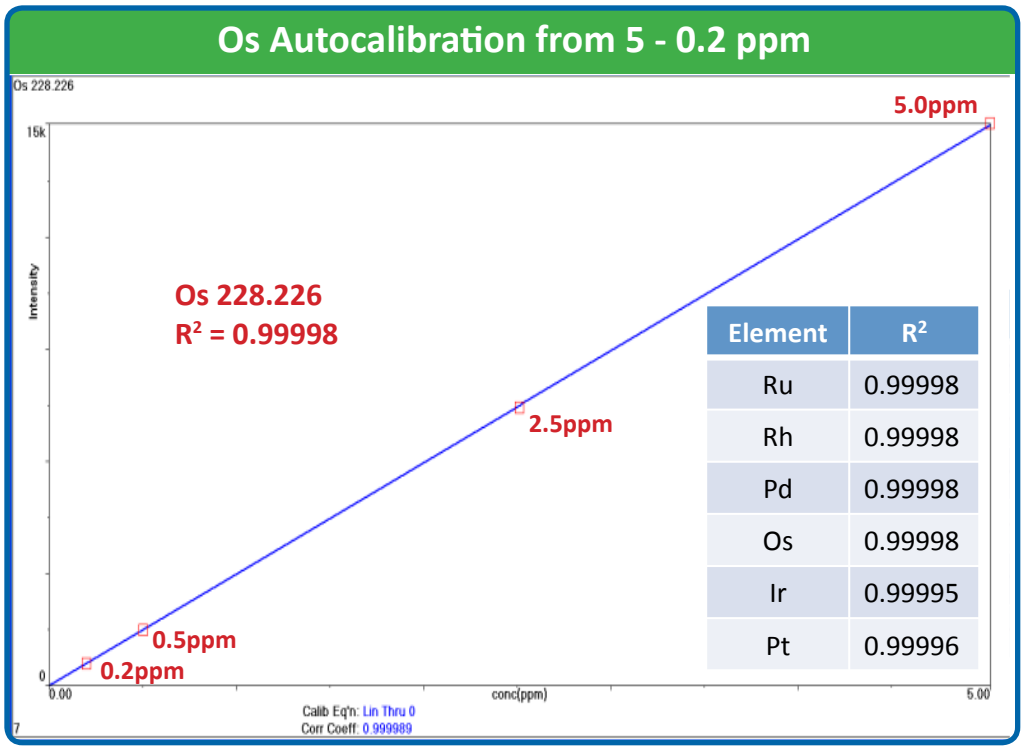

Figure 1. prep*FAST* automatically generates a 0.2 (25x), 0.5 (10x), 2.5 (2x) and 5.0 (1x) calibration curve from a 5 ppm Au, Ir, Os, Pd, Pt, Rh, and Ru (5% HCl/5% HNO_3) stock standard solution. Precise and accurate syringe based inline autodilution is illustrated through excellent linearity of all calibration curves.

Abstract

Fire assay is one of the oldest known techniques for purifying precious metals. Typically Ni (Au, Ir, Os, Pd, Pt, Rh, and Ru) or Pb (Au, Pt and Pd) are used to scavenge precious metals from their matrix during fusion. The resultant sulfide bead and extracted precious metals are then digested in strong mineral acids (50% Aqua Regia). Using prep*FAST,* sample digests (50% Aqua Regia) can simply be placed on the autosampler rack with a blank and a 5 ppm multi-element (Au, Ir, Os, Pd, Pt, Rh, and Ru) stock standard. The prep*FAST* system will automatically generate a 0.2 (25x), 0.5 (10x), 2.5 (2x) and 5.0 (1x) calibration curve and analyze samples at a rate of nearly 90/hr.

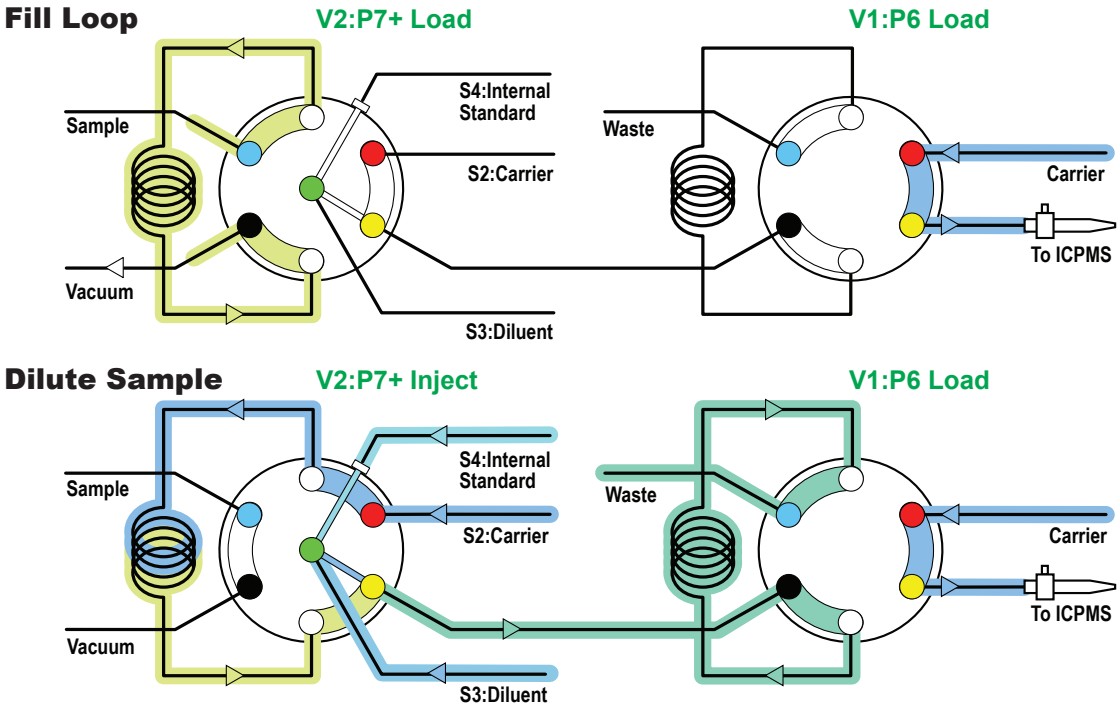

Figure 2. The prep*FAST* system schematic illustrating 1) sample loading during spray chamber rinse and 2) sample injection dilution and internal standardization.

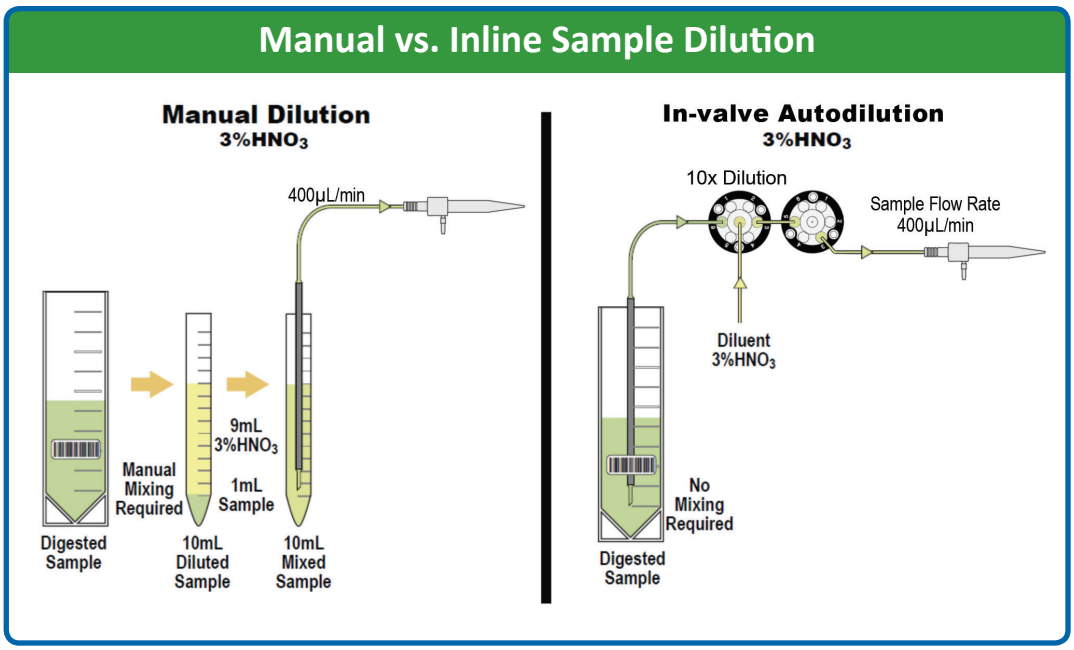

Figure 3. Mixing inline eliminates the need to premix/dilute samples in discrete tubes prior to analysis. This cost effective approach improves sample throughput, saves time, and reduces labware and reagent consumption. After in-valve dilution, the sample is injected (400 µL/min) at the user's desired flow rate.

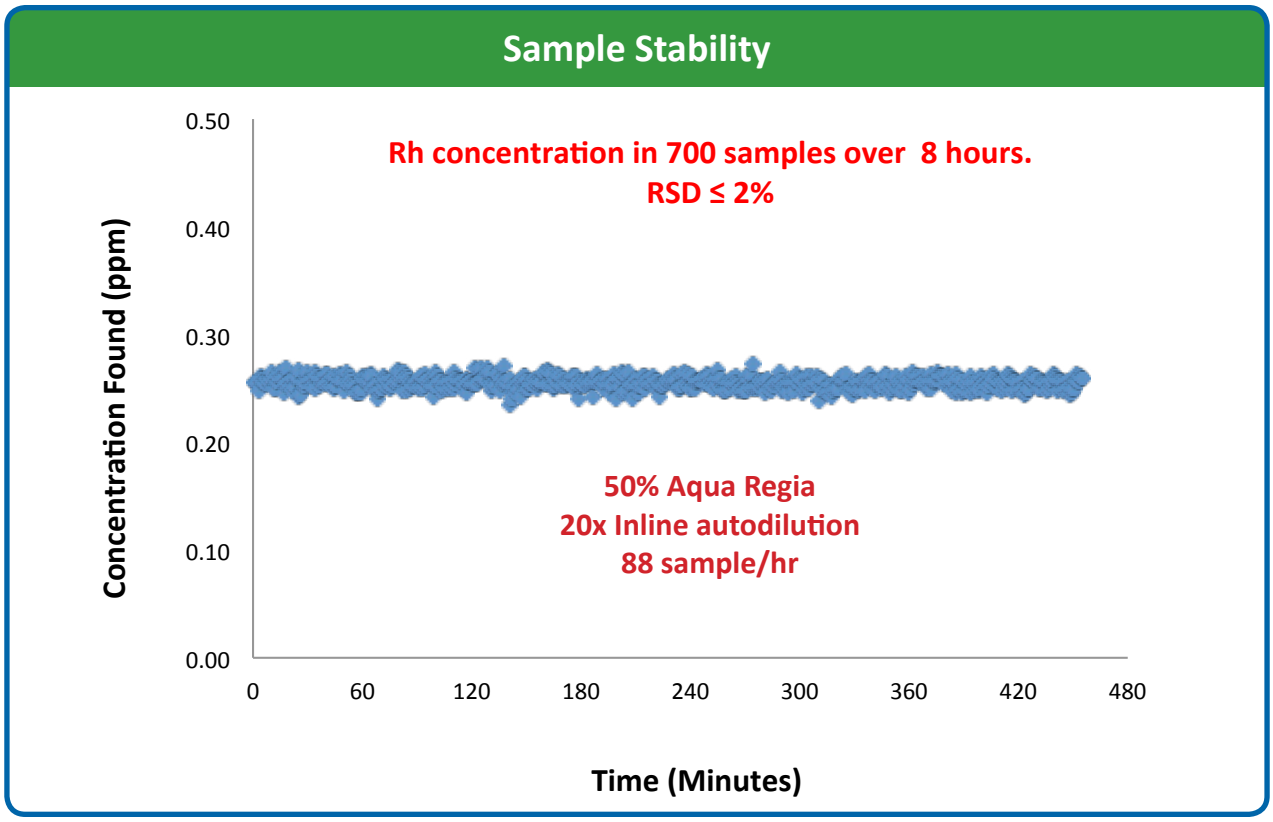

Figure 4. A 5ppm Au, Os, Ir, Pt, Pd, Rh, and Ru sample prepared in 50% Aqua Regia simulates a fire assay digestion. The concentrated mineral acid solution is diluted 20x inline for 700 replicate sample analysis of 0.25 ppm of precious metals. prep*FAST* inline autodilution illustrates not only a rapid throughput at 88 samples per hour, but also very accurate reproducible results for a 50% Aqua Regia matrix.

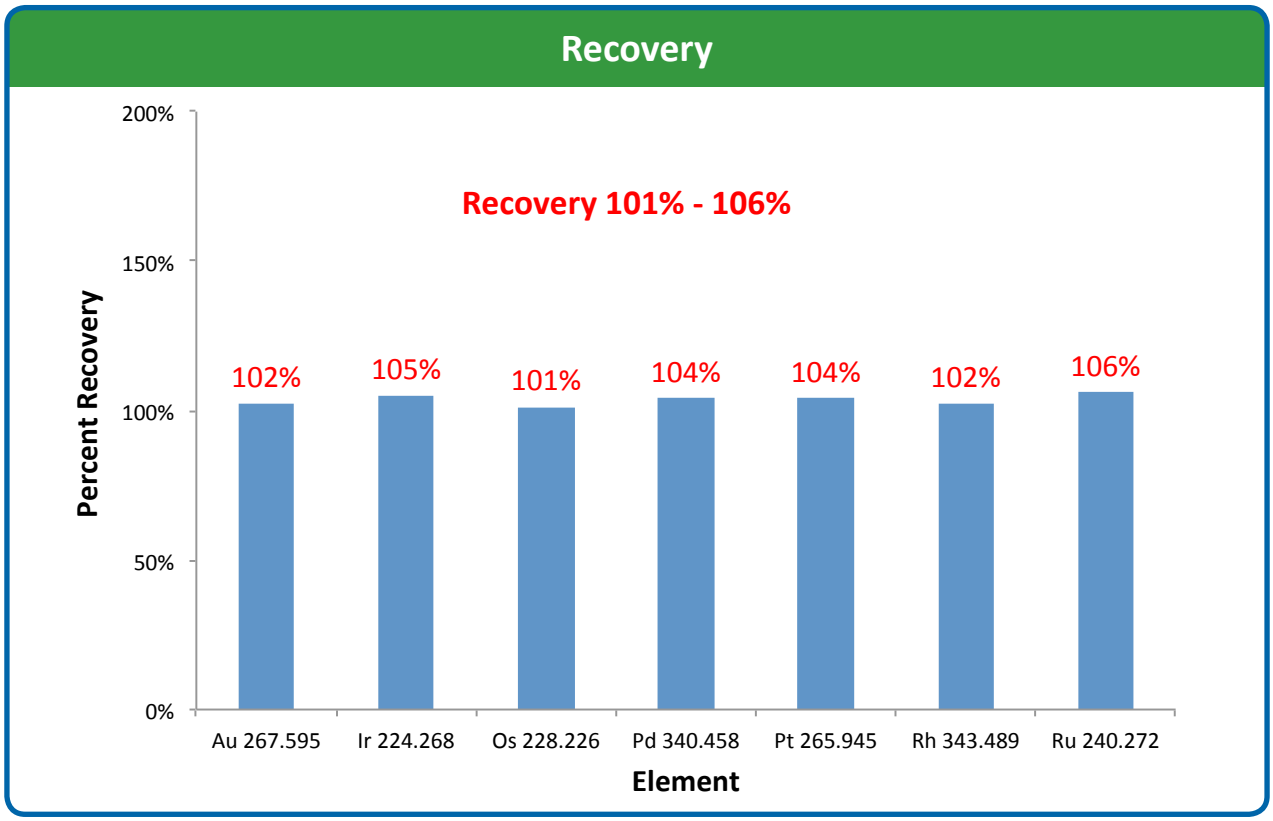

Figure 5. Recovery based on the 700 analysis of 0.25 ppm precious metal is both quantitative (101 to 106%) and precise (<3%).

Benefits:

- Reduce cost per analysis through inline sample dilution
  - ✔ Cut sample time in half
  - ✔ Reduce the amount of diluent (by 20x)
  - ✔ Reduce the number of vials (by half)
  - ✔ Eliminate hazardous (50% Aqua Regia) manual sample dilution step
- Simply place rack with digested samples on the autosampler and run

SC-2 DX prep*FAST* System

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