Semi-automated equipment for tube sealing, gas cleanup, and graphitization at the Lalonde AMS Laboratory

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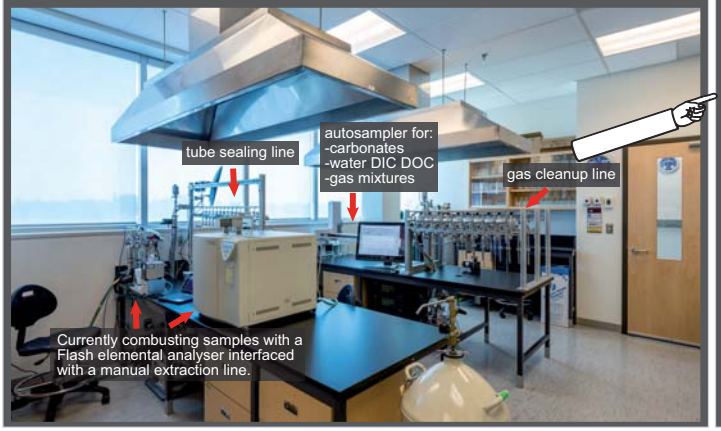
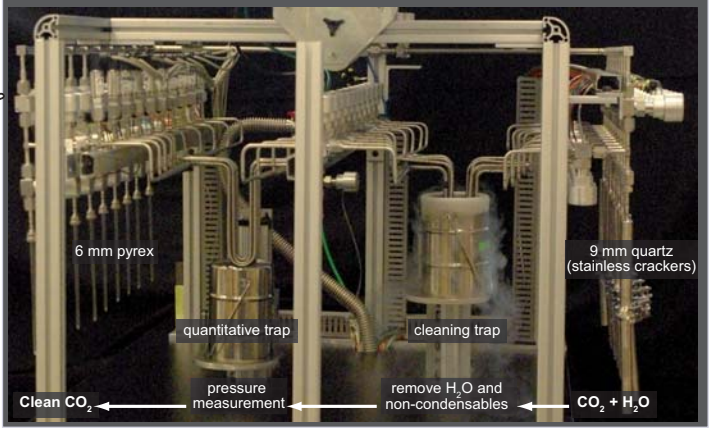
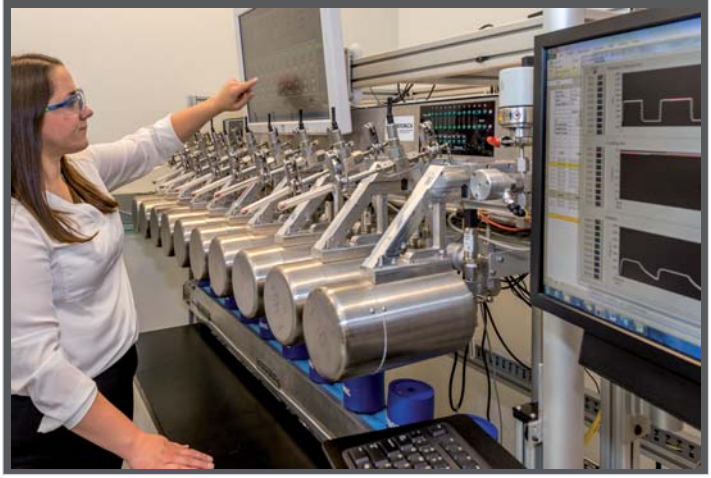
The "CO2" Room



Semi-automated gas cleanup line



Semi-automated graphitization line (#1/3)



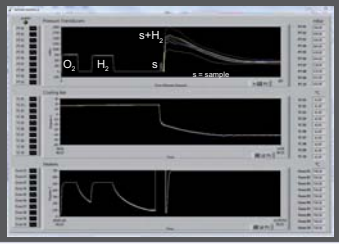
Equipment features

Equipment for quartz tube sealing, gas cleanup, and graphitization at the Lalonde AMS Laboratory was designed for **user friendliness** and **high throughput.**

The valves, cooling table, and ovens are controlled by custom **Labview software** (right top), which also monitors pressure, cooling, and heating temperatures throughout the graphitization reaction (right bottom). The main operator interface is a **touch screen** monitor; software interlocks reduce the chance of losing a sample, cross-contamination, or damaging a vacuum pump, and **automated routines** for leak checking and iron conditioning minimize operator time.

All of the **stainless steel vacuum lines** are **orbitally welded** to ensure clean seams; the ovens are suficiently insulated to provide a safe exterior temperature, and the cooling cups (cooled by a closed loop system running Dynalene as a circulating fluid) are **very efficient at removing water.**

Results from the first year of routinely measured standards, reference, and background material are reproducible and within specifications. In the first year of operation, with samples combusted by elemental analyzer, over 1000 targets (~60% unknowns) were produced (see accompanying poster).



Work in progress

Autosampler (below) for carbonate, water (DIC DOC) and gas headspace extractions. The autosampler will be interfaced with the new gas cleanup line.

Heating mantles will be fitted under the autosampler (above) to heat bottles for DIC and DOC extractions.

Small samples (<200 µg): Modification of the the reactors (below) on the third graphitization line to reduce the volume.

Made in Canada

All of the equipment shown here was made in Canada.
Design: Liam Kieser & Gilles St-Jean
Orbital welding and machining: uOttawa Machine Shop
Electronics, Labview: uOttawa Electronics Shop

Feedback

Pneumatic sample press (in-house design and construction)

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