OnSpec for Measuring Melt Chemistry to Improve Metal Quality, Reduce Energy and Gaseous Emissions, and Greatly Increase Production Opportunity

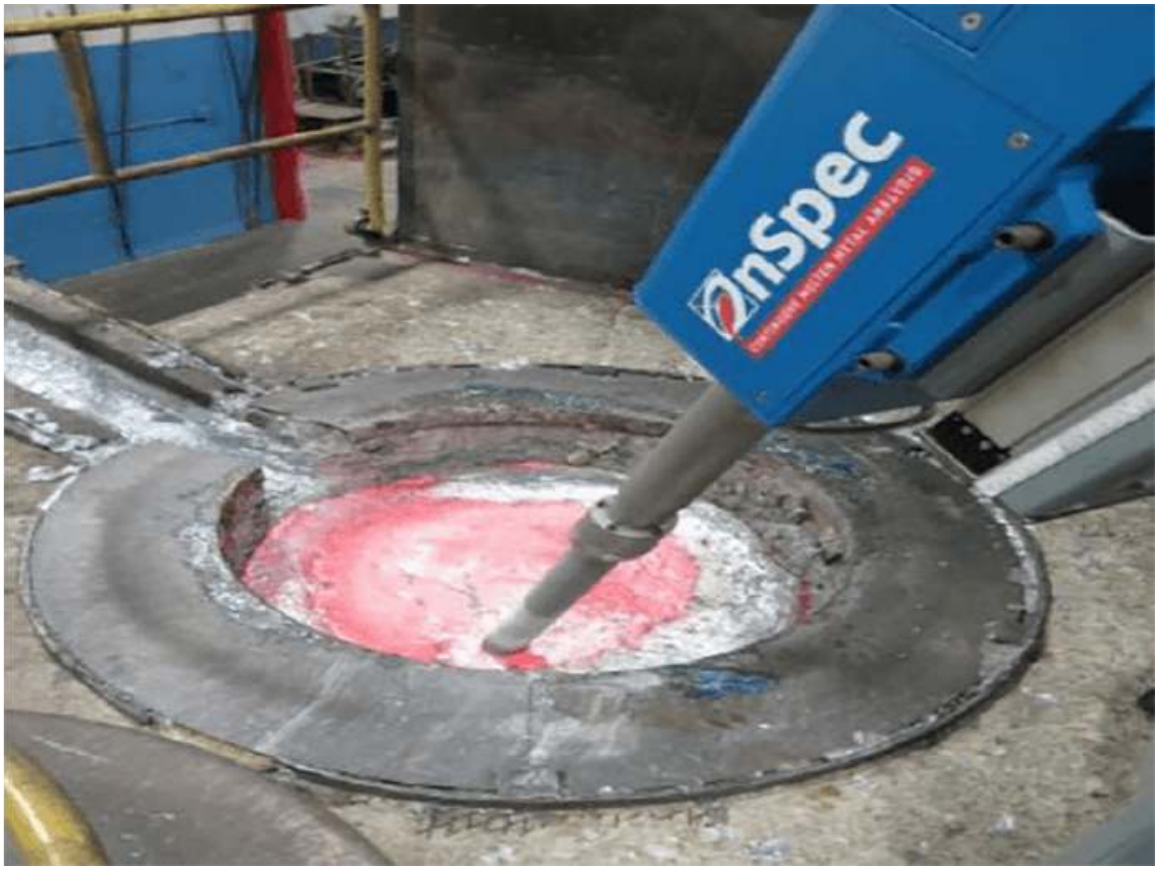
Companies that process scrap aluminum require strict knowledge of the melt's chemistry to assure the correct mechanical properties are achieved in the final product. Great care is taken in periodically measuring the chemistry, while the scrap is being melted, by taking molten samples, freezing, machining, and measuring them in a spark spectrometer. While this has been the industry standard for many years, it suffers from two drawbacks. The first is that it takes time to process the samples, anywhere from 10 to 30 minutes, which forces the melting furnace to idle which reduces production. And second, there are errors introduced in the measurement because of the sample preparation steps required.

Melt Cognition, a joint venture of Energy Research Company (Plainfield, NJ), Material Strategies LLC (West Boylston, MA), and wTe (Bedford, MA) with funding from ARPA-E and collaborating with ACRC has developed an advanced laser system to measure the melt chemistry in-situ and in real time. Termed OnSpec, it uses a laser to interrogate the melt though a probe inserted in the melt. The resulting emitted light, along with proprietary software, identifies each element and its concentration, thus providing the complete chemistry of the melt continuously and at any instant.

Figure 1: OnSpec Mockup Operating in a Reverbatory Furnace.

Results You Can Use

- Provides real time chemistry measurements
- Increases production by eliminating the downtime of manually taking molten samples and waiting for lab results.
- Eliminates measurement errors endemic with conventional methods since sample preparation is not needed.
- Reduces energy use since more production is possible with no additional energy input
- Improves operator safety since molten button samples are not collected which eliminates the operator's close contact with the hot aluminum melt.
- Tells the plant operator when an alloy addition has completely mixed and dissolved.
- Tells the plant operator when an alloy changeover is completed, and the new alloy is ready to be cast or rolled.
- Easy to use with minimal operator training required.



- *Figure 2: OnSpec Taking Chemistry Measurements on an Induction Furnace at Mercury Marine (Fond du Lac, WI).*
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