Analysis of Welding Electrodes with the Thermo Scientific NITON® XL3t 800 Series

NITON XL3 Series Handheld Analyzers — Simply Superior XRF

Application

Several types of welding electrodes are produced for specific applications and are available in different sizes and compositions. For example, tungsten (W) electrodes are used for tungsten inert gas (TIG) welding and usually have an added element to improve performance. These elements include zirconium (Zr), thorium (Th), cerium (Ce), and lanthanum (La) at concentrations up to 2 percent. The Thermo Scientific NITON XL3t analyzer with its powerful 50 kV x-ray tube can be used to quantify these elements in welding electrodes for both quality control (QC) and positive material identification (PMI).

Selecting the correct tungsten electrode is necessary for producing high-quality welds. Rods with the wrong additive element, or with incorrect amounts of the specified element (out of specification), can damage the work, leading to lost production time and costly rework.

Method

For this application study, four types of electrodes were analyzed: pure tungsten, thorium dioxide doped tungsten, cerium dioxide doped tungsten, and lanthanum oxide doped tungsten. The electrodes were analyzed as received from the supplier using an XL3t 800 Series alloy analyzer. Five 30-second readings were taken of the sample electrodes.

Results

Table 1 shows the results obtained from the XL3t 800 Series instrument. The concentration range specified by the manufacturer for each type of electrode is given in the second column. The values obtained for each element are given along with the 95 percent confidence interval in the remaining columns. <LOD means that the concentration found was less than the limit of detection. The ensuing results fall well within the manufacturer's specified range.

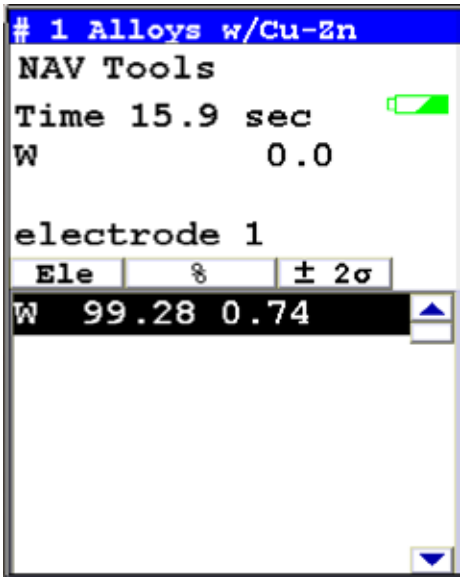
SAMPLE	Spec %	Th %	Ce%	% La	Remainder
EWTh-2	1.6-1.9 Th	1.8 +/-0.08	<LOD	<LOD	W
EWCe-2	1.5-1.8 Ce	<LOD	1.7 +/-0.19	<LOD	W
EWLa-1.5	1.0-1.4 La	<LOD	<LOD	1.2 +/-0.13	W
SK	0.77-0.94 La	<LOD	<LOD	0.9 +/-0.12	W
W	99.5 W	<LOD	<LOD	<LOD	W

Table 1: Comparison of manufacturer's-specified range with NITON XRF analyzer results, based on the average of five 30-second readings for each electrode

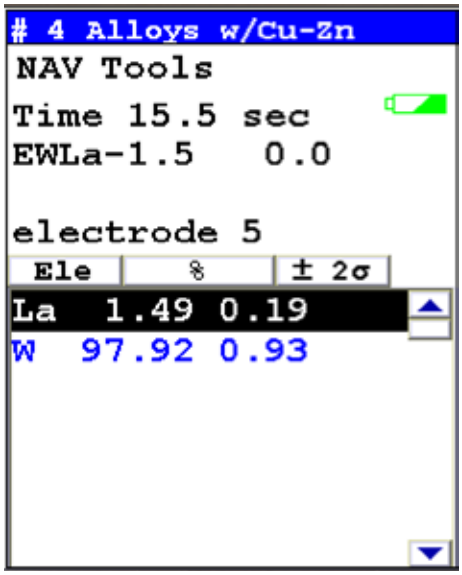
Comments

Results achieved using the Thermo Scientific NITON XL3t 800 Series alloy analyzer demonstrates that electrodes can be analyzed directly, as received, in 30 seconds or less. This provides a quick quality check and positively identifies the electrode in question, not only helping to increase productivity and decrease rework, but also of specific benefit when qualifying new suppliers. Precision will increase proportionately with increased measurement times.

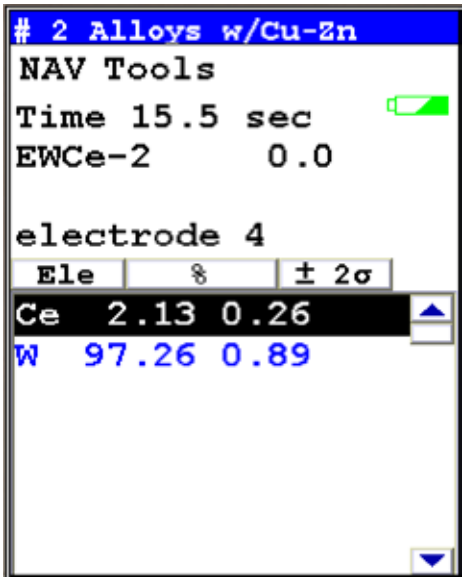
To discuss your particular applications and performance requirements, or to schedule an on-site demonstration and see for yourself how Thermo Scientific NITON analyzers can help save you time and money, please contact your local NITON Analyzers representative or contact Thermo Fisher Scientific directly by email at ***niton@thermofisher.com,*** or visit our website at ***www.thermo.com/niton.***



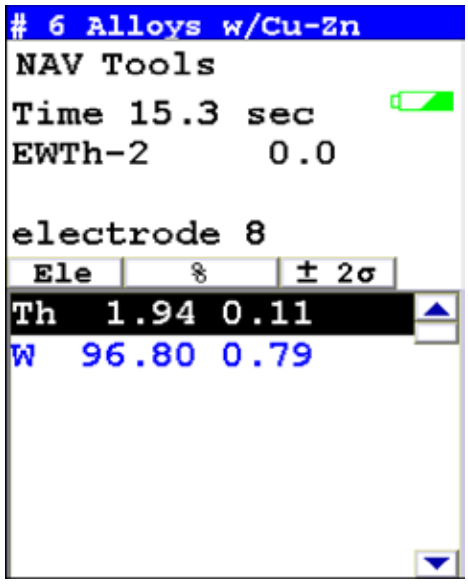
Example of pure tungsten welding electrode analysis



Example of lanthanum oxide doped tungsten welding electrode analysis



Example of cerium dioxide doped tungsten welding electrode analysis



Example of thorium dioxide doped tungsten welding electrode analysis

In addition to the offices listed below, Thermo Fisher Scientific maintains a network of sales and service organizations throughout the world.

Americas
Billerica, MA USA
+1 978 670 7460
niton@thermofisher.com

Europe
Munich, Germany
+49 89 3681 380
niton.eur@thermofisher.com

Asia
Central, Hong Kong
+852 2869 6669
niton.asia@thermofisher.com

www.thermo.com/niton

N3 8-307 06/2008