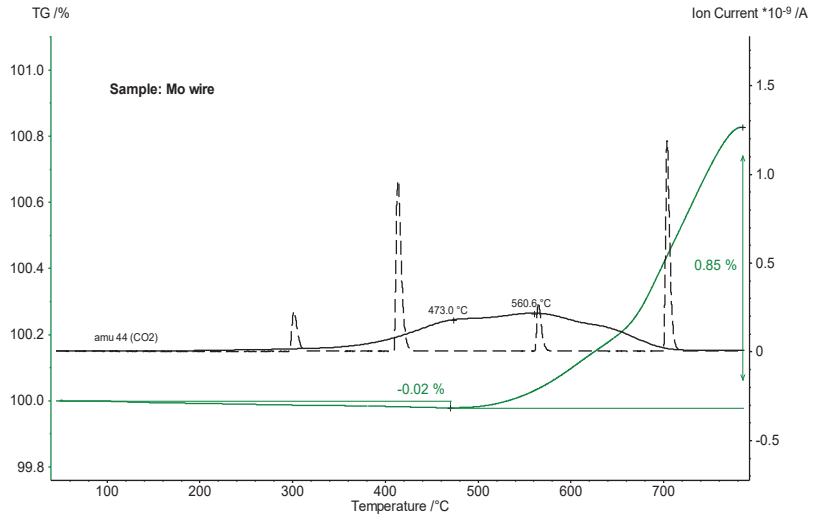
APPLICATION**SHEET**

Metals/Alloys · Metal Industry
STA 449 *Jupiter*®-QMS 403 *Aëolos*®

Molybdenum Wire

Introduction

A wire is a single, usually cylindrical, elongated strand of drawn metal. Wires are used to bear mechanical loads and to carry electricity and telecommunication signals. Metals useful for producing wires must in the first place be ductile and strong in tension. Metals suitable for wires are, for example, platinum, silver, iron, copper, aluminum and gold. Special purpose wires, however, are made using other metals (e.g., tungsten wire for light bulbs and vacuum tube filaments because of its high melting temperature). Molybdenum is frequently employed in the construction of powder tube grids and support structures which also require high-temperature strength, low vapor pressure and low thermal expansion. High-temperature vacuum and hydrogen atmosphere furnaces also rely on the use of molybdenum rods and wires to form resistant heating elements.



Test Conditions

Temperature range:	RT ... 800°C
Heating rate:	10 K/min
Atmosphere:	Synthetic air at 70 ml/min
Sample mass:	4153.9 mg
Crucible:	Al_2O_3 beaker
Sensor:	TGA type S

Test Results

A molybdenum wire sample was heated in a dynamic air atmosphere. Below ~500°C, a small mass loss of 0.02% occurred followed by an increase in sample mass of 0.85%. This increase is due to oxidation of the sample. At the same time, carbon impurities on the wire surface are burnt what can be seen from the mass spectrometer signal for mass number 44 due to the CO_2 evolvement (full line). The carbon amount could be quantified to ~900ppm by means of the NETZSCH *Pulse*TA® device: During an empty run, several CO_2 pulses of defined volumes (0.25 ml and 1 ml) were injected into the STA which was detected by the mass spectrometer (dashed line). From the ratio of the ion current peak areas of the calibration pulses and the signal from the sample, the amount of CO_2 evolved from the sample can be calculated. The sensitivity of the NETZSCH mass spectrometer is linear and temperature-independent.

NGB · Application Sheet 054 · E · 0621 · Technical specifications are subject to change.

NETZSCH-Gerätebau GmbH
Wittelsbacherstraße 42 · 95100 Selb · Germany
Phone: +49 9287/881-0 · Fax: +49 9287/881505
at@netzsch.com · www.netzsch.com