Inorganic Application Note

Carbon in Tungsten Carbide Powder

Instrument
WC-200 Carbon Determinator

Calibration Standard
NIST 276b, BCS 352, LECO 501-123 Tungsten Carbide, or other suitable standards

Accessories
528-018 Ceramic Crucibles (preheated), 528-043 Ceramic Covers (preheated), 501-263 Copper, 502-173 Iron Chip, 773-579 Metal Scoop

Program Settings

Pre-Analyze Purge	20 seconds
Pre-Analyze Delay	0 seconds
Collect Time	50 seconds
Trap Purge Time	65 seconds
Carbon Minimum Time-Out	35 seconds
Carbon Comparator Level	1.0%

Sample Weight
~0.25 ±0.005 grams

Sample Preparation
Uniform powder

Method
1. Preheat ceramic crucibles and covers in a muffle or tube furnace at 1350°C for not less than 15 minutes or at 1000°C for not less than 40 minutes. Remove the crucibles from the furnace, cool for 1-2 minutes and place in a desiccator for storage. If the crucibles are not used within four hours, they should be rebaked.
2. Prepare the instrument as outlined in the operator's instruction manual.
3. Determine the instrument blank.
   a. Enter 1.000 gram weight into weight stack.
   b. Add 1.00 (±0.005 g) of 501-263 Copper and 1.000 (±0.005 g) of 502-231 Iron Chip.
   c. Place crucible cover on crucible.
   d. Place crucible on furnace pedestal and analyze.
   e. Repeat steps 3a through 3d a minimum of three times.
   f. Enter blank following routine outlined in operator's instruction manual.

WC200

4. Calibrate instrument.
   a. Weigh ~0.250 g (±0.005 g) Tungsten Carbide calibration standard into a preheated 528-018 Crucible and enter weight into weight stack.
   b. Add 1.000 g (±0.005 g) of 501-263 Copper and 1.000 g (±0.005 g) 502-231 Iron Chip to the crucible.
   c. Place crucible cover on crucible.
   d. Place crucible on furnace pedestal and analyze.
   e. Repeat steps 4a through 4d a minimum of three to five times and calibrate the instrument following the auto calibration procedure as outlined in the operator's instruction manual.
   f. Verify the calibration by analyzing the calibration standard again. It should fall within the expected tolerance. If not, repeat steps 4a through 4e.
5. Analyze samples.
   a. Weigh ~0.250 g (±0.005 g) sample into a preheated 528-018 Crucible and enter weight into weight stack.
   b. Add 1.000 g (±0.005 g) of 501-263 Copper and 1.000 g (±0.005 g) 502-231 Iron Chip to the crucible.
   c. Place crucible cover on crucible.
   d. Place crucible on furnace pedestal and analyze.

NOTE: For optimum results, a five-place balance is recommended. Crucibles and covers should be handled with crucible tongs.

Typical Results

Sample	Weight	% Carbon
BCS 352	0.25800	6.107
Tungsten Carbide	0.25120	6.122
6.116%C	0.25636	6.118
	0.25728	6.114
	0.25972	6.113
	0.25792	6.117
	0.25425	6.114
	0.25845	6.111
	0.25483	6.108
	0.25584	6.108
	0.25734	6.116
	0.25308	6.120
	0.25061	6.118
	0.25515	6.121
	0.25034	6.126
	Average	***6.1155***
	Std. Deviation	***0.00557***
	RSD (%)	***0.091%***

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