

ETV-ICP

Limits of Detection

Your graphite is only as pure as the analysis!

- quart Quantified with ETV-ICP
- Quantified with ETV-ICP with other parameters
- Not Quantified
- Not Possible to Quantify

Detection Limits = ppb (Parts per Billion)
(Limits are in white numerals)

H Hydrogen																	He Helium						
Li Lithium 5	Be Beryllium 1																	B Boron 5	C Carbon	N Nitrogen	O Oxygen	F Fluorine	Ne Neon
Na Sodium 10	Mg Magnesium 0.1																	Al Aluminum 10	Si Silicon 50	P Phosphorus 20	S Sulfur 30	Cl Chlorine	Ar Argon
K Potassium 10	Ca Calcium 1	Sc Scandium	Ti Titanium 2	V Vanadium 2	Cr Chromium 5	Mn Manganese 1	Fe Iron 2	Co Cobalt 2	Ni Nickel 5	Cu Copper 2	Zn Zinc 1	Ga Gallium 5	Ge Germanium 50	As Arsenic 20	Se Selenium	Br Bromine	Kr Krypton						
Rb Rubidium	Sr Strontium	Y Yttrium 1	Zr Zirconium 1	Nb Niobium	Mo Molybdenum 10	Tc Technetium	Ru Ruthenium	Rh Rhodium	Pd Palladium	Ag Silver 10	Cd Cadmium 5	In Indium	Sn Tin 10	Sb Antimony	Te Tellurium 20	I Iodine	Xe Xenon						
Cs Cesium	Ba Barium 1	La Lanthanum	Hf Hafnium 1	Ta Tantalum 10	W Tungsten 10	Re Rhenium	Os Osmium	Ir Iridium	Pt Platinum	Au Gold	Hg Mercury	Tl Thallium	Pb Lead 10	Bi Bismuth	Po Polonium	At Astatine	Rn Radon						
Fr Francium	Ra Radium	Ac Actinium	Rf Rutherfordium	Db Dubnium																			
					Ce Cerium	Pr Praseodymium	Nd Neodymium	Pm Promethium	Sm Samarium	Eu Europium	Gd Gadolinium	Tb Terbium	Dy Dysprosium	Ho Holmium	Er Erbium	Tm Thulium	Yb Ytterbium	Lu Lutetium					
					Th Thorium	Pa Protactinium	U Uranium	Np Neptunium	Pu Plutonium	Am Americium	Cm Curium	Bk Berkelium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium					

All Blue & Green Elements detectable using Monochromator (Selectable). White numbers define detection levels of selected Elements for Polychromator (35).

Analysis of Purified Graphite: Comparison with independent methods

(all values in ppb)

Element	ETV-ICP	GDMS	ICP - OES *	Element	ETV-ICP	GDMS	ICP - OES *
Al	40 ± 10	45 ± 10	< 50	Mg	42 ± 5	52 ± 10	90 ± 10
B	< 30	30 ± 10	< 50	Mn	<1	<5	<5
Ca	45 ± 8	55 ± 20	100 ± 20	Na	57 ± 10	48 ± 10	70 ± 10
Co	< 2	< 5	< 10	Ni	14 ± 3	< 10	< 20
Cr	8 ± 2	< 50	< 10	Ti	12 ± 2	15 ± 5	10 ± 3
Cu	58 ± 10	63 ± 10	54 ± 7	V	22 ± 5	<20	<20
Fe	32 ± 5	27 ± 6	25 ± 3	Zn	7 ± 2	<50	37 ± 8
K	30 ± 10	50 ± 20	70 ± 8				

ETV-ICP = Electro Thermal Vaporization – Inductively Coupled Plasma

GDMS = Glow-Discharge Mass Spectrometry

ICP-OES = Inductively Coupled Plasma- Optical Emission Spectrometry

* Sample decomposition achieved by cold plasma ashing