ELECTRONIC SUPPLEMENTARY INFORMATION

Instrumental parameters of the ICP MS

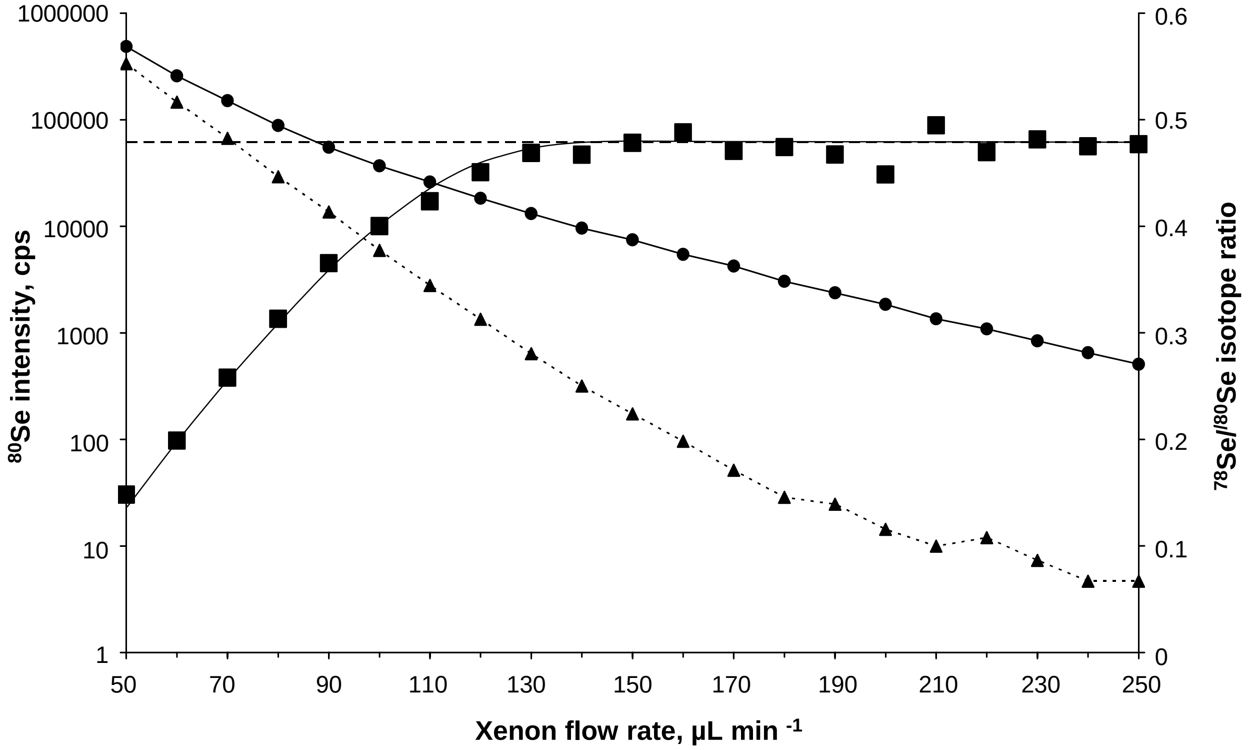
ICP MS (Agilent 7500ce)	Xenon collision cell	Hydrogen reaction cell
rf power	1550 W	1500 W
Sampling depth	9 mm	7.5 mm
Cones	Nickel	Nickel
Nebulizer gas flow	0.9 L min^{-1}	0.8 L min^{-1}
Makeup gas flow	0.35 L min^{-1}	0.25 L min^{-1}
Cell gas flow	130 - 160 µL min^{-1} Xe	3 - 5 mL min^{-1} H_2
Extraction lens 1	8.0 V	4 V
Extraction lens 2	-130 V	-140 V
Cell entrance	- 28 V	- 50 V
Octopole bias	- 45 V	- 18 V
Quadrupole bias	- 1.4 V	- 17 V

Elimination of polyatomic interferences with xenon as collision gas

Ar_2^+ interferences. The collision energy resulting from the collision of argon dimers with xenon atoms can be calculated using eqn. (1):

$$E_{cm} = \frac{m_c}{m_c + m_i} E_{lab} \qquad (1)$$

E_{cm} corresponds to the collision energy in the centre of mass, m_c to the mass of the collision gas and m_i to the mass of the polyatomic ion. E_{lab} is the kinetic energy achieved by the potential difference between the extraction lens and the collision/reaction cell. Under the instrumental conditions used in this study the collision energy was calculated to be 22.4 eV which was distinctly higher than the dissociation energy of the Ar_2^+ ion (1.24 – 1.33 eV).[1] Thus a collision induced dissociation of the argon dimers with xenon should be possible under these conditions. The elimination of the Ar_2^+ interferences was achieved by a xenon flow rate above 130 µL min^{-1} which was confirmed by an accurate $^{78}Se/^{80}Se$ isotope ratio measurement (Figure) without mathematical interference corrections.



Selenium intensity and isotope ratios as function of the xenon gas flow rate in the collision cell. (●) ^{80}Se intensity for a 100 µg L^{-1} selenium solution; (▲) ^{80}Se intensity for a blank solution (1.5 % (v/v) HNO_3). (■) Experimental ^{78}Se/^{80}Se isotope ratios after mass bias correction; dashed horizontal line: theoretical ^{78}Se/^{80}Se isotope ratio (0.47934).

(1) W. R. Wadt, *J. Chem. Phys.*, 1978, **68**, 412.