Group 16 / VIA; Chalcogenides

or Oxygen Group

Basics

Chalcogenides comes from Greek and means "ore formers". That is true enough since most ores are oxides or sulfides (plus a few carbonates). In less graecophilic times like right no (2011; Euro crisis, allegedly started by the Greeks but in truth by the American way of life), we call those elements "oxygen group"

- Nothing needs to be said about the importance of oxygen (O). You can't do without for more then a few minutes, because oxidizing some of the slime inside you produces the energy needed to keep your entropy down and to get you going.

- Sulfur (S), if disliked in steel, is an important element in many products, e.g. you car tires. Sulfuric acid (H_2SO_4 is produced in large quantities (100 Mio tons per year) since it is indispensable in the chemical industry.
  Selenium (Se) is found inside copy machines and in some solar cells. Tellurium (Te) is also found in high-tech compounds but only in small quantities.
  Polonium (Po) is radioactive, so forget it.

Table of Basic Data

Name *(German)*	**Oxygen** *Sauerstoff*	**Sulfur** *Schwefel*	**Selenium** *Selen*	**Tellurium** *Tellur*	**Polonium** *Polonium*
Atomic number	8	16	34	52	84
Atomic mass [u]	16,0	32,07	78,96	127,6	208,98
Melting point [K]	54,75	386	490	722,7	527
Melting point [^oC]	-218,25	113	217	449,7	254
Melting point [^oF]	-360	235	422	842	489
Boiling point [K]	-90,19	717,82	958,1	1263	1235
Density [g/cm^3]	1,33	2,06	4,82	6,25	9,20
Ionization energy [eV]	13,62	10,36	9,75	9,01	8,42
Electronegativitiy	3,5	2,4	2,5	2,0	1,8
Atomic radius [pm]	60,4	104	116	143,2	167,5
Ionic radius [pm]	132	29	69	97	65
Oxidation numbers	-2, -1	6, 4, 2, -2	6, 4, -2	6, 4, 2, -2	6, 4, 2
Lattice typ **Transformation temp. [^oC]**	sc	op	r	r	op
Lattice constant [Å] (a or c)	?	?	?	4,45 5,91	?

Young's - Modul us [GPa]	?	?	?	4,12	?
Therm. expansion coefficient α [$10^{-6}K^{-1}$]	?	?	?	?	?

- In case of doubt all numbers are for room temperatures
- fcc = face centered cubic; lattice const. = a
  bcc = body centered cubic
  sc = simple cubic
  hp = simple hexagonal
  hcp = hexagonal close packed; lattice constants a and c.
  op = simple orthorhombic, monoclinic, triclinic
  tp = simple tetragonal
  dia = diamond structure
  r = trigonal or rhomboedral trigonal