

Group 7 / VIIB; Manganese Group

Manganese has enormous technical importance; most steels need to contain some of the stuff. Your run-of-the-mill battery probably contains manganese compounds, and there are many other uses. Fortunately, it's plentiful and cheap.

Rhenium is rare and not much used. Technetium does not occur naturally but must be made "technically" (hence the name) in a nuclear reactor.

Basics

Table of Basic Data

Name (German)	Manganese <i>Mangan</i>	Technetium <i>Technetium</i>	Rhenium <i>Rhenium</i>
Atomic number	25	43	75
Atomic mass [u]	54,93805	98,9063	186,207
Melting point [K]	1517	2445	3453
Melting point [°C]	1244	2172	3180
Melting point [°F]	2.271	3942	5756
Boiling point [K]	2370	5303	5900
Density [g/cm ³]	7,44	11,49	21,03
Ionization energy [eV]	7,435	7,28	7,88
Electro-negativity	1,6	1,4	1,5
Atomic radius [pm]	124	135,8	137,0
Ionic radius [pm]	91	56	60
Oxidation numbers	7 bis -3	7 bis -3	7 bis -3
Lattice typ Transformation temp. [° C]	bcc 1138 fcc 1095 sc	hcp -	hcp -
Lattice constant [Å] (a or c)	8,89	2,74 4,39	2,76 4,46
Young's - Modul us [GPa]	208	407	461
Therm. expansion coefficient α [10 ⁻⁶ K ⁻¹]	21	?	6,8

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