ELEMENTS OF FIRST TRANSITION SERIE (3d)

Group-3 Sc (Scandium) Period-4

Latin Name: Scandium **Year Of Discovery:** 1879 **Discoverer:** Lars F. Nilson

Physical Properties

Atomic Number	21	**Molar Mass (g mol^{-1})**	44.955908
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$ or $[Ar]3d^1 4s^2$		
Density (g cm^{-3}) at 20°C	3.01	**Oxidation States**	+2, +3
Atomic Radius (pm)	Empirical: 162	**Element Category**	Transition Metal
Covalent Radius (pm)	170 ± 7	**Van der Waals Radius (pm)**	211
Ionic Radius (divalent ion) (pm)	81 (Sc^{2+})	**Ionisation Energy (kJ/mol)**	633.1 (1st), 1235.0 (2nd), 2388.6 (3rd)
Molar Volume (cm^3 mol^{-1})	15.02	**Electronegativity**	1.36 (Pauling scale)
Melting Point (°C)	1539	**Boiling Point (°C)**	2730
Phase at STP	Solid	**CAS Number**	7440-20-2
Electrical Resistivity (nΩm) (293.15 K)	562	**Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)**	$+315 \times 10^{-6}$
Magnetic Ordering	Paramagnetic	**Thermal Conductivity (Wm^{-1}K^{-1})**	15.8
Heat Of Fusion (kJ mol^{-1})	14.1	**Heat Of Vapourization (kJ mol^{-1})**	332.7
Molar Heat Capacity (J mol^{-1}K^{-1})	25.52	**Vapour Pressure**	100 kPa (at 3101 K)
Crystal Structure	hcp	**Youngs's Modulus (GPa)**	74.4

Chemical Properties

Scandium has silvery-white lustre but gets tarnished in air due to formation of Sc_2O_3. Scandium forms compounds only in +3 oxidation state. All the scandium compounds in +3 state are colourless and diamagnetic.

Nuclear Properties	Not radioactive
Isotopes	^{44}Sc (Synthetic), ^{45}Sc (≈100% abundance), ^{46}Sc (Synthetic), ^{47}Sc (Synthetic), ^{48}Sc (Synthetic).
Ores	Scandium occurs in nature only in combined state. It is present in minerals such as monazite which is complex of phosphate.
Uses	Gets tarnished in air and form Sc_2O_3.
Compounds	Sc_2O_3, ScF_3, $Sc(OH)_3$, ScC_2, $[ScF_6]^{3-}$.

Group-4 Ti (Titanium) Period-4

Latin Name: Titanium **Year Of Discovery:** 1791 **Discoverer:** William Gregor

Physical Properties

Atomic Number	22	Molar Mass (g mol^{-1})	47.867
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$ or $[Ar]3d^2 4s^2$		
Density (g cm^{-3})	4.506	Oxidation States	+2, +3, +4
Atomic Radius (pm)	Empirical: 147	Element Category	Transition Metal
Covalent Radius (pm)	160±8	Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	658.8 (1^{st}), 1309.8 (2^{nd}), 2652.5 (3^{rd})
Molar Volume (cm^3 mol^{-1})		Electronegativity	1.54 (Pauling Scale)
Melting Point (°C)	1668	Boiling Point (°C)	3287
Phase at STP	Solid	CAS Number	7440-32-6
Electrical Resistivity (nΩm) (293.15 K)	420	Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	21.9
Heat Of Fusion (kJ mol^{-1})	14.15	Heat Of Vapourization (kJ mol^{-1})	425
Molar Heat Capacity (J $mol^{-1}K^{-1}$)	25.06	Vapour Pressure	100 kPa At 3558 K
Crystal Structure	hcp	Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-5 V (Vanadium) Period-4

Latin Name: Vanadium **Year Of Discovery:** 1801 **Discoverer:** Andres Manuel del Rio

Physical Properties

Atomic Number	23	Molar Mass (g mol^{-1})	50.9415
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$ or $[Ar]3d^3 4s^2$		
Density (g cm^{-3})	6.00	Oxidation States	+2, +3, +4, +5
Atomic Radius (pm)	Empirical: 134	Element Category	Transition Metal
Covalent Radius (pm)	153±8	Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	650.9 (1^{st}), 1414 (2^{nd}), 2830 (3^{rd})
Molar Volume (cm^3 mol^{-1})		Electronegativity	1.63 (Pauling scale)
Melting Point (°C)	1910	Boiling Point (°C)	3407
Phase at STP	Solid	CAS Number	7440-62-2
Electrical Resistivity (nΩm) (293.15 K)	197	Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	$+255\times10^{-6}$
Magnetic Ordering	Paramagnetic	Thermal Conductivity ($Wm^{-1}K^{-1}$)	30.7
Heat Of Fusion (kJ mol^{-1})	21.5	Heat Of Vapourization (kJ mol^{-1})	444
Molar Heat Capacity (J $mol^{-1}K^{-1}$)	24.89	Vapour Pressure	100 kPa (at 3679 K)
Crystal Structure	bcc	Youngs's Modulus (GPa)	128

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-6 Cr (Chromium) Period-4

Latin Name: Chromium **Year Of Discovery:** 1797 **Discoverer:** Louis Nicolas Vauquelin

Physical Properties

Atomic Number	24	Molar Mass (g mol^{-1})	51.9961
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$ or $[Ar]3d^5 4s^1$		
Density (g cm^{-3})	7.19	Oxidation States	+2, +3, +4, +5, +6
Atomic Radius (pm)	Empirical: 128	Element Category	Transition Metal
Covalent Radius (pm)	139±5	Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	652.9 (1^{st}), 1590.6 (2^{nd}), 2987 (3^{rd})
Molar Volume (cm^3 mol^{-1})		Electronegativity	1.66 (Pauling scale)
Melting Point (°C)	1907	Boiling Point (°C)	2671
Phase at STP		CAS Number	7440-47-3
Electrical Resistivity (nΩm) (293.15 K)	125	Magnetic Susceptibility (cm^3 mol^{-1}) (273K)	$+280\times10^{-6}$
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	93.9
Heat Of Fusion (kJ mol^{-1})	21	Heat Of Vapourization (kJ mol^{-1})	347
Molar Heat Capacity (J $mol^{-1}K^{-1}$)	23.35	Vapour Pressure	100 kPa (at 2942 K)
Crystal Structure	bcc	Youngs's Modulus (GPa)	279

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-7 Mn (Manganese) Period-4

Latin Name: Manganum **Year Of Discovery:** 1774 **Discoverer:** Carl Wilhelm Scheele

Physical Properties

Atomic Number	25	Molar Mass (g mol^{-1})	54.938045
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$ or $[Ar]3d^5 4s^2$		
Density (g cm^{-3})	7.21	Oxidation States	+2,+3,+4, +5,+6,+7
Atomic Radius (pm)	Empirial: 127	Element Category	Transition Metal
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	717.3 (1^{st}), 1509 (2^{nd}), 3248 (3^{rd})
Molar Volume (cm^3 mol^{-1})		Electronegativity	1.55 (Pauling scale)
Melting Point (°C)	1246	Boiling Point (°C)	2061
Phase at STP	Solid	CAS Number	7439-96-5
Electrical Resistivity (nΩm) (293.15 K)	1.44	Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	$+255\times10^{-6}$
Magnetic Ordering	Paramagnetic	Thermal Conductivity ($Wm^{-1}K^{-1}$)	7.81
Heat Of Fusion (kJ mol^{-1})	12.91	Heat Of Vapourization (kJ mol^{-1})	221
Molar Heat Capacity (J $mol^{-1}K^{-1}$)	26.32	Vapour Pressure	100 kPa (at 2333 K)
Crystal Structure	bcc	Youngs's Modulus (GPa)	198

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-8 Fe (Iron) Period-4

Latin Name: Ferrum **Year Of Discovery:** 1774 **Discoverer:** -

Physical Properties

Atomic Number	25	Molar Mass (g mol^{-1})	55.845
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$ or $[Ar]3d^5 4s^2$		
Density (g cm^{-3})	7.874	Oxidation States	+2,+3,+4,+6
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	1.83 (Pauling Scale)
Melting Point (°C)	1538	Boiling Point (°C)	2862
Phase at STP	Solid	CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})	13.81	Heat Of Vapourization (kJ mol^{-1})	340
Molar Heat Capacity (J $mol^{-1}K^{-1}$)	25.10	Vapour Pressure	
Crystal Structure	bcc	Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-9 Co (Cobalt) Period-4

Latin Name: Cobaltum **Year Of Discovery:** 1735 **Discoverer:** Georg Brandt

Physical Properties

Atomic Number	27	Molar Mass (g mol^{-1})	58.933195
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$ or $[Ar]3d^7 4s^2$		
Density (g cm^{-3})	8.90	Oxidation States	+2, +3, +4
Atomic Radius (pm)	Empirical: 125	Element Category	Transition Metal
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	760.4 (1^{st}), 1648(2^{nd}), 3232 (3^{rd})
Molar Volume (cm^3 mol^{-1})		Electronegativity	1.88 (Pauling scale)
Melting Point (°C)	1495	Boiling Point (°C)	2927
Phase at STP	Solid	CAS Number	7440-48-4
Electrical Resistivity (nΩm) (293.15 K)	62.4	Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	-
Magnetic Ordering	Ferromagnetic	Thermal Conductivity ($Wm^{-1}K^{-1}$)	100
Heat Of Fusion (kJ mol^{-1})	16.06	Heat Of Vapourization (kJ mol^{-1})	377
Molar Heat Capacity (J $mol^{-1}K^{-1}$)	24.81	Vapour Pressure	100 kPa (at 3198 K)
Crystal Structure	hcp	Youngs's Modulus (GPa)	209

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-10 Ni (Nickel) Period-4

Latin Name: Niccolum **Year Of Discovery:** 1751 **Discoverer:** -

Physical Properties

Atomic Number	28	Molar Mass (g mol^{-1})	58.6934
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$ or $[Ar]3d^8 4s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	+2, +3, +4,
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-11

Cu (Copper)

Period-4

Latin Name: Cuprum **Year Of Discovery:** 8000 BC **Discoverer:** -

Physical Properties

Atomic Number	29	Molar Mass (g mol^{-1})	63.546
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$ or $[Ar]3d^{10}4s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-12 Zn (Zinc) Period-4

Latin Name: Zincum **Year Of Discovery:** 1500 **Discoverer:** -

Physical Properties

Atomic Number	30	Molar Mass (g mol^{-1})	65.38
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10}$ or $[Ar]3d^{10}4s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

ELEMENTS OF SECOND TRANSITION SERIE (4d)

Group-3 **Y (Yttrium)** Period-5

Latin Name: Yttrium **Year Of Discovery:** 1794 **Discoverer:** -

Physical Properties

Atomic Number	39	Molar Mass (g mol^{-1})	88.90585
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^1$ or $[Kr]4d^1 5s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-4 Zr (Zirconium) Period-5

Latin Name: Zirconium **Year Of Discovery:** 1789 **Discoverer:** -

Physical Properties

Atomic Number	40	Molar Mass (g mol^{-1})	91.224
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^2$ or $[Kr] 4d^2 5s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-5 Nb (Niobium) Period-5

Latin Name: Niobium **Year Of Discovery:** 1801 **Discoverer:** -

Physical Properties

Atomic Number	41	Molar Mass (g mol^{-1})	92.90638
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^4$ or $[Kr] 4d^4 5s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-6 Mo (Molybdenum) Period-5

Latin Name: Molybdenum **Year Of Discovery:** 1781 **Discoverer:** -

Physical Properties

Atomic Number	42	Molar Mass (g mol^{-1})	95.96
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^5$ or $[Kr]4d^5 5s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-7

TC (Technetium)

Period-5

Latin Name: Technetium **Year Of Discovery:** 1937 **Discoverer:** -

Physical Properties

Atomic Number	43	Molar Mass (g mol^{-1})	97.9072
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^5$ or $[Kr]4d^5 5s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-8 Ru (Ruthenium) Period-5

Latin Name: Ruthenium **Year Of Discovery:** 1844 **Discoverer:** -

Physical Properties

Atomic Number	44	Molar Mass (g mol^{-1})	101.07
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^7$ or $[Kr] 4d^7 5s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-9 Rh (Rhodium) Period-5

Latin Name: Rhodium **Year Of Discovery:** 1803 **Discoverer:** -

Physical Properties

Atomic Number	45	Molar Mass (g mol^{-1})	102.9055
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^8$ or $[Kr] 4d^8 5s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-10 Pd (Palladium) Period-4

Latin Name: Palladium **Year Of Discovery:** 1803 **Discoverer:** -

Physical Properties

Atomic Number	46	Molar Mass (g mol^{-1})	106.42
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^0 4d^{10}$ or $[Kr] 4d^{10} 5s^0$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-11 Ag (Silver) Period-5

Latin Name: Argentum **Year Of Discovery:** 3000 BC **Discoverer:** -

Physical Properties

Atomic Number	47	Molar Mass (g mol^{-1})	107.8682
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^{10}$ or $[Kr] 4d^{10} 5s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-12 Cd (Cadmium) Period-5

Latin Name: Cadmium **Year Of Discovery:** 1817 **Discoverer:** -

Physical Properties

Atomic Number	48	Molar Mass (g mol^{-1})	112.411
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10}$ or $[Kr] 4d^{10} 5s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

ELEMENTS OF THIRD TRANSITION SERIE (5d)

Group-3 **La (Lanthanum)** Period-6

Latin Name: Lanthanum **Year Of Discovery:** 1839 **Discoverer:** -

Physical Properties

Atomic Number	57	Molar Mass (g mol^{-1})	139.90547
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 5d^1$ or $[Xe]5d^1 6s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-4 Hf (Hafnium) Period-6

Latin Name: Hafnium **Year Of Discovery:** 1923 **Discoverer:** -

Physical Properties

Atomic Number	72	Molar Mass (g mol^{-1})	178.49
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^2$ or $[Xe] 5d^2 6s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-5 Ta (Tantalum) Period-6

Latin Name: Tantalum **Year Of Discovery:** 1802 **Discoverer:** -

Physical Properties

Atomic Number	73	Molar Mass (g mol^{-1})	180.94788
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^3$ or $[Xe] 4f^{14} 5d^3 6s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-6 W (Tungsten) Period-6

Latin Name: Wolframium	**Year Of Discovery:** 1783	**Discoverer:** -

Physical Properties

Atomic Number	74	Molar Mass (g mol^{-1})	183.85
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^1 4f^{14} 5d^5$ or $[Xe] 4f^{14} 5d^5 6s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-7 Re (Rhenium) Period-6

Latin Name: Rhenium **Year Of Discovery:** 1925 **Discoverer:** -

Physical Properties

Atomic Number	75	Molar Mass (g mol^{-1})	186.207
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^5$ or $[Xe] 4f^{14} 5d^5 6s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-8 Os (Osmium) Period-6

Latin Name: Osmium **Year Of Discovery:** 1803 **Discoverer:** -

Physical Properties

Atomic Number	76	Molar Mass (g mol^{-1})	190.21
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^6$ or $[Xe] 4f^{14} 5d^6 6s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-9 Ir (Iridium) Period-6

Latin Name: Iridium **Year Of Discovery:** 1803 **Discoverer:** -

Physical Properties

Atomic Number	77	Molar Mass (g mol^{-1})	192.217
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^7$ or $[Xe] 4f^{14} 5d^7 6s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-10 # Pt (Platinum) Period-6

Latin Name: Platinum **Year Of Discovery:** 1735 **Discoverer:** -

Physical Properties

Atomic Number	78	Molar Mass (g mol^{-1})	195.084
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^1 4f^{14} 5d^9$ or $[Xe] 4f^{14} 5d^9 6s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-11 Au (Gold) Period-6

Latin Name: Aurum **Year Of Discovery:** 2500 BC **Discoverer:** -

Physical Properties

Atomic Number	79	Molar Mass (g mol^{-1})	196.966569
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^1 4f^{14} 5d^{10}$ or $[Xe] 4f^{14} 5d^{10} 6s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-12 # Hg (Mercury) Period-6

Latin Name: Hydragyrum **Year Of Discovery:** 1500 BC **Discoverer:** -

Physical Properties

Atomic Number	80	Molar Mass (g mol^{-1})	200.59
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10}$ or $[Xe] 4f^{14} 5d^{10} 6s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

ELEMENTS OF FOURTH TRANSITION SERIE (5d)

Group-3 Ac (Actinium) Period-7

Latin Name: Actinium **Year Of Discovery:** 1899 **Discoverer:** -

Physical Properties

Atomic Number	89	Molar Mass (g mol^{-1})	200
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5d^1$ or $[Rn]6d^1 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-4 Rf (Rutherfordium) Period-7

Latin Name: Rutherfordium **Year Of Discovery:** 1964 **Discoverer:** -

Physical Properties

Atomic Number	104	Molar Mass (g mol^{-1})	261
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^2$ or $[Rn] 5f^{14} 6d^2 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-5 Db (Dubnium) Period-7

Latin Name: Dubnium	**Year Of Discovery:** 1967	**Discoverer:** -

Physical Properties

Atomic Number	105	Molar Mass (g mol^{-1})	262
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^3$ or $[Rn] 5f^{14} 6d^3 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-6 Sg (Seaborgium) Period-7

Latin Name: Seaborgium **Year Of Discovery:** 1974 **Discoverer:** -

Physical Properties

Atomic Number	106	Molar Mass (g mol^{-1})	266
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^4$ or $[Rn] 5f^{14} 6d^4 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-7 Bh (Bohrium) Period-7

Latin Name: Bohrium **Year Of Discovery:** 1981 **Discoverer:** -

Physical Properties

Atomic Number	107	Molar Mass (g mol^{-1})	264
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^5$ or $[Rn] 5f^{14} 6d^5 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-8

Hs (Hassium)

Period-7

Latin Name: Hassium **Year Of Discovery:** 1984 **Discoverer:** -

Physical Properties

Atomic Number	108	Molar Mass (g mol^{-1})	277
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^6$ or $[Rn] 5f^{14} 6d^6 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-9 Mt (Meitnerium) Period-7

Latin Name: Meitnerium **Year Of Discovery:** 1982 **Discoverer:** -

Physical Properties

Atomic Number	109	Molar Mass (g mol^{-1})	277
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^7$ or $[Rn]5f^{14}6d^7 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-10 Ds (Darmstadtium) Period-7

Latin Name: Darmstadtium **Year Of Discovery:** 1994 **Discoverer:** -

Physical Properties

Atomic Number	110	Molar Mass (g mol^{-1})	271
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^8$ or $[Rn] 5f^{14} 6d^8 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-11 Rg (Roentgenium) Period-7

Latin Name: Roentgenium **Year Of Discovery:** 1994 **Discoverer:** -

Physical Properties

Atomic Number	111	Molar Mass (g mol^{-1})	272
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^1 5f^{14} 5d^{10}$ or $[Rn] 5f^{14} 6d^{10} 7s^1$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
Uses	
Compounds	

Group-12 Cn (Copernicium) Period-7

Latin Name: Copernicium **Year Of Discovery:** 1996 **Discoverer:** -

Physical Properties

Atomic Number	112	Molar Mass (g mol^{-1})	285
Electronic Configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^{14} 5d^{10}$ or $[Rn] 5f^{14} 6d^{10} 7s^2$		
Density (g cm^{-3}) at 20°C		Oxidation States	
Atomic Radius (pm)		Element Category	
Covalent Radius (pm)		Van der Waals Radius (pm)	
Ionic Radius (divalent ion) (pm)		Ionisation Energy (kJ/mol)	
Molar Volume (cm^3 mol^{-1})		Electronegativity	
Melting Point (°C)		Boiling Point (°C)	
Phase at STP		CAS Number	
Electrical Resistivity (nΩm) (293.15 K)		Magnetic Susceptibility (cm^3 mol^{-1}) (292 K)	
Magnetic Ordering		Thermal Conductivity ($Wm^{-1}K^{-1}$)	
Heat Of Fusion (kJ mol^{-1})		Heat Of Vapourization (kJ mol^{-1})	
Molar Heat Capacity (J $mol^{-1}K^{-1}$)		Vapour Pressure	
Crystal Structure		Youngs's Modulus (GPa)	

Chemical Properties

Nuclear Properties	
Isotopes	
Ores	
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