

# Iridium

*Ir*

## ***General Information***

### **Discovery**

Iridium was discovered by S. Tennant in 1803 in London.

### **Appearance**

Iridium is a hard, lustrous, platinum-like metal.

### **Source**

Iridium occurs uncombined in nature in alluvial deposits, and is recovered commercially as a by-product of nickel refining.

### **Uses**

Iridium is used principally as a hardening agent for platinum. It also forms an alloy with osmium which is used for pen tips and compass bearings. It is the most corrosion-resistant material known, and was used in making the standard metre bar, which is an alloy of 90% platinum and 10% iridium.

### **Biological Role**

Iridium has no known biological role, and has low toxicity.

## Physical Information

Atomic Number	77
Relative Atomic Mass ( $^{12}\text{C}=12.000$ )	192.2
Melting Point/K	2683
Boiling Point/K	4403
Density/ $\text{kg m}^{-3}$	22420
Ground State Electron Configuration	$[\text{Xe}]4f^{14}5d^76s^2$
Electron Affinity (M-M $^-$ )/ $\text{kJ mol}^{-1}$	-190

## Key Isotopes

Nuclide	$^{191}\text{Ir}$	$^{192}\text{Ir}$	$^{193}\text{Ir}$
Atomic mass	190.96		192.96
Natural abundance	37.3%	0%	62.7%
Half-life	stable	74.2 days	stable

## Ionisation Energies/ $\text{kJ mol}^{-1}$

M - M $^+$	880
M $^+$ - M $^{2+}$	1680
M $^{2+}$ - M $^{3+}$	2600
M $^{3+}$ - M $^{4+}$	3800
M $^{4+}$ - M $^{5+}$	5500
M $^{5+}$ - M $^{6+}$	6900
M $^{6+}$ - M $^{7+}$	8500
M $^{7+}$ - M $^{8+}$	10000
M $^{8+}$ - M $^{9+}$	11700
M $^{9+}$ - M $^{10+}$	

## Other Information

Enthalpy of Fusion/ $\text{kJ mol}^{-1}$	26.4
Enthalpy of Vaporisation/ $\text{kJ mol}^{-1}$	612.1

### Oxidation States

Main	$\text{Ir}^{+3}, \text{Ir}^{+4}$
Others	$\text{Ir}^{-1}, \text{Ir}^0, \text{Ir}^{+1}, \text{Ir}^{+2}, \text{Ir}^{+5}, \text{Ir}^{+6}$