

# Indium

*In*

## ***General Information***

### **Discovery**

Indium was discovered by F. Reich and H. Richter in 1863 in Freiberg, Germany

### **Appearance**

Indium is a very soft, silvery-white metal with a brilliant lustre.

### **Source**

Indium is often associated with zinc minerals and iron, lead and copper ores. It is commercially produced from the zinc minerals, usually as a by-product.

### **Uses**

Indium has semiconductor uses in transistors, thermistors and photoconductors. It is also used to make low-temperature alloys; for example, an alloy of 24% indium-76% gallium is liquid at room temperature. Indium can also be plated on to metal and evaporated on to glass to give a mirror with better resistance than silver to corrosion. A tiny long-lived indium battery has been devised to power new electronic watches.

### **Biological Role**

Indium has no known biological role but is teratogenic. It has a low order of toxicity.

### **General Information**

Indium is stable in air and with water, but dissolves in acids.

## Physical Information

Atomic Number	49
Relative Atomic Mass ( $^{12}\text{C}=12.000$ )	114.82
Melting Point/K	429.32
Boiling Point/K	2353
Density/kg m <sup>-3</sup>	7310 (298K)
Ground State Electron Configuration	[Kr]4d <sup>10</sup> 5s <sup>2</sup> 5p <sup>1</sup>
Electron Affinity (M-M <sup>-</sup> )/kJ mol <sup>-1</sup>	34

## Key Isotopes

Nuclide	<sup>111</sup> In	<sup>113</sup> In	<sup>115</sup> In
Atomic mass		112.9	114.9
Natural abundance	0%	4.3%	95.7%
Half-life	2.81 days	stable	6x10 <sup>14</sup> yrs

## Ionisation Energies/kJ mol<sup>-1</sup>

M - M <sup>+</sup>	558.3
M <sup>+</sup> - M <sup>2+</sup>	1820.6
M <sup>2+</sup> - M <sup>3+</sup>	2704
M <sup>3+</sup> - M <sup>4+</sup>	5200
M <sup>4+</sup> - M <sup>5+</sup>	7400
M <sup>5+</sup> - M <sup>6+</sup>	9500
M <sup>6+</sup> - M <sup>7+</sup>	11700
M <sup>7+</sup> - M <sup>8+</sup>	13900
M <sup>8+</sup> - M <sup>9+</sup>	17200
M <sup>9+</sup> - M <sup>10+</sup>	19700

## Other Information

Enthalpy of Fusion/kJ mol <sup>-1</sup>	3.27
Enthalpy of Vaporisation/kJ mol <sup>-1</sup>	231.8

### Oxidation States

Main	In <sup>III</sup>
Others	In <sup>I</sup> , In <sup>II</sup>

### Covalent Bonds/kJ mol<sup>-1</sup>

Not applicable