

# Californium

**Cf**

## ***General Information***

### **Discovery**

Californium was discovered by S.G. Thompson, K. Street, A. Ghiorso and G.T. Seaborg in 1950 in California, USA.

### **Appearance**

Californium is a radioactive, silvery metal.

### **Source**

Californium did not exist in weighable amounts until ten years after its discovery. The usual method of preparation, producing milligram amounts only, is by neutron bombardment of plutonium.

### **Uses**

Californium is a very strong neutron emitter. It is therefore used as a portable neutron source for the discovery of metals such as gold and silver. One isotope,  $^{252}\text{Cf}$ , is used in cancer therapy.

### **Biological Role**

Californium has no known biological role. It is toxic due to its radioactivity.

### **General Information**

Californium is attacked by oxygen, steam and acids, but not by alkalis.

## Physical Information

Atomic Number	98
Relative Atomic Mass ( $^{12}\text{C}=12.000$ )	251 (radioactive)
Melting Point/K	Not available
Boiling Point/K	Not available
Density/kg m <sup>-3</sup>	Not available
Ground State Electron Configuration	[Rn]5f <sup>10</sup> 7s <sup>2</sup>
Electron Affinity (M-M <sup>-</sup> )/kJ mol <sup>-1</sup>	Not available

## Key Isotopes

Nuclide	<sup>249</sup> Cf	<sup>251</sup> Cf	<sup>252</sup> Cf
Atomic mass	249.07		
Natural abundance	0%	0%	0%
Half-life	360 yrs	900 yrs	2.65 yrs

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

M - M <sup>+</sup>	608
M <sup>+</sup> - M <sup>2+</sup>	
M <sup>2+</sup> - M <sup>3+</sup>	
M <sup>3+</sup> - M <sup>4+</sup>	
M <sup>4+</sup> - M <sup>5+</sup>	
M <sup>5+</sup> - M <sup>6+</sup>	
M <sup>6+</sup> - M <sup>7+</sup>	
M <sup>7+</sup> - M <sup>8+</sup>	
M <sup>8+</sup> - M <sup>9+</sup>	
M <sup>9+</sup> - M <sup>10+</sup>	

## Other Information

Enthalpy of Fusion/kJ mol<sup>-1</sup> Not available

Enthalpy of Vaporisation/kJ mol<sup>-1</sup> Not available

### Oxidation States

Main Cf<sup>+3</sup>

Others Cf<sup>+2</sup>, Cf<sup>+4</sup>