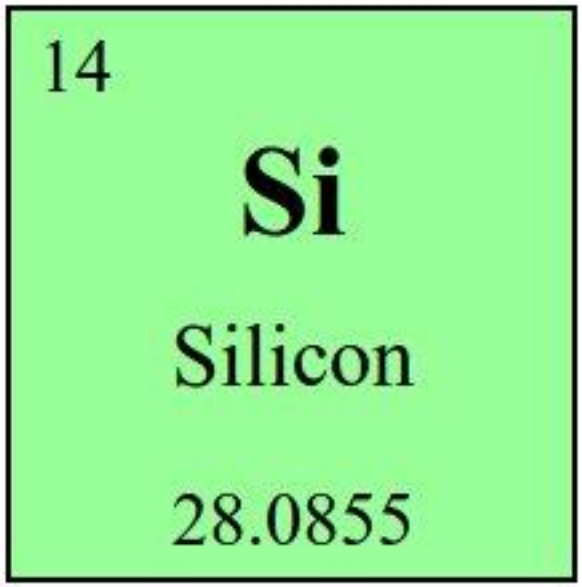
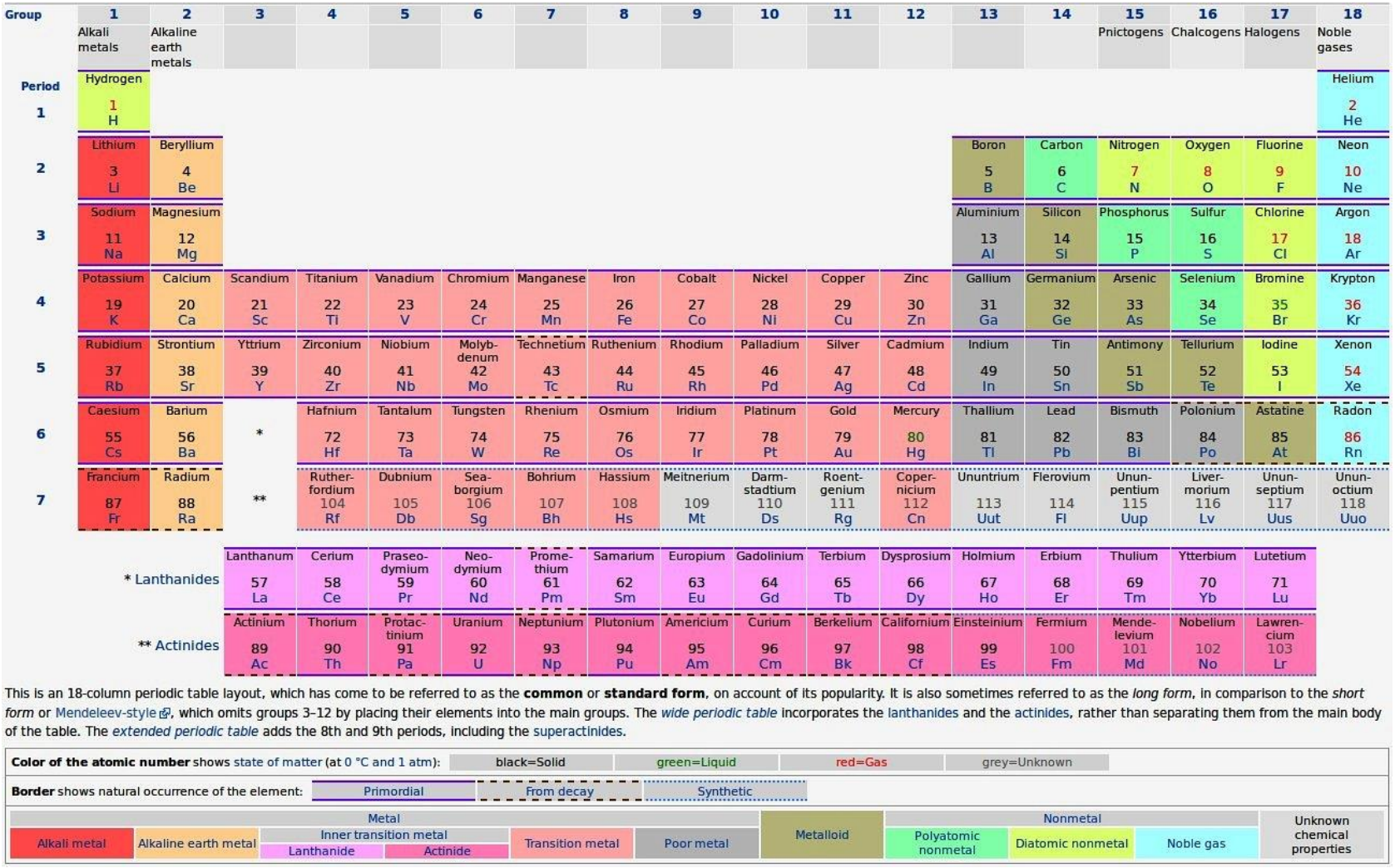
Silicon – The Stuff that Chips are made of

The Element Silicon



Atomic Number: 14
Atomic Weight: 28.0855
Melting Point: 1687 K (1414°C or 2577°F)
Boiling Point: 3538 K (3265°C or 5909°F)
Density: 2.3296 grams per cubic centimeter
Phase at Room Temperature: Solid
Element Classification: Semi-metal
Period Number: 3 **Group Number:** 14

Silicon in the Periodic Table



This is an 18-column periodic table layout, which has come to be referred to as the **common** or **standard form**, on account of its popularity. It is also sometimes referred to as the *long form*, in comparison to the *short form* or Mendeleev-style, which omits groups 3–12 by placing their elements into the main groups. The *wide periodic table* incorporates the lanthanides and the actinides, rather than separating them from the main body of the table. The *extended periodic table* adds the 8th and 9th periods, including the superactinides.

Color of the atomic number shows state of matter (at 0 °C and 1 atm): black=Solid | green=Liquid | red=Gas | grey=Unknown

Border shows natural occurrence of the element: Primordial | From decay | Synthetic

Metal: Alkali metal | Alkaline earth metal | Inner transition metal (Lanthanide | Actinide) | Transition metal | Poor metal

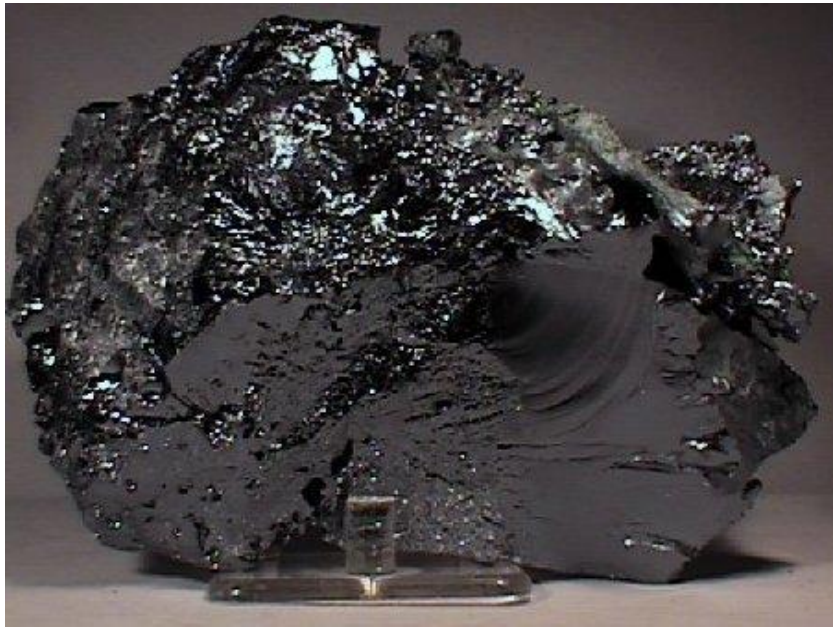
Metalloid

Nonmetal: Polyatomic nonmetal | Diatomic nonmetal | Noble gas

Unknown chemical properties

From Sand to Crystal

Purified Polysilicon Chip



Natural sources of Silicon:
Quartz, Jasper, Flint, Sand, etc.

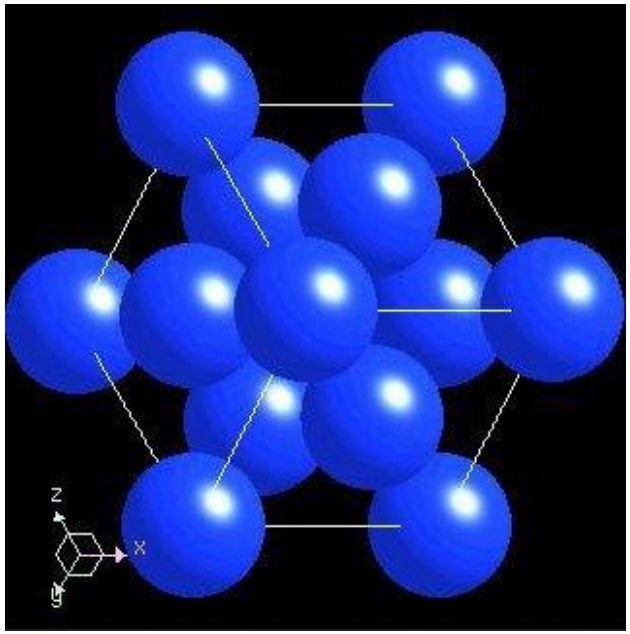
Crystal Growth

Czochralski Process

Silicon Crystal Structure

Silicon Ingot

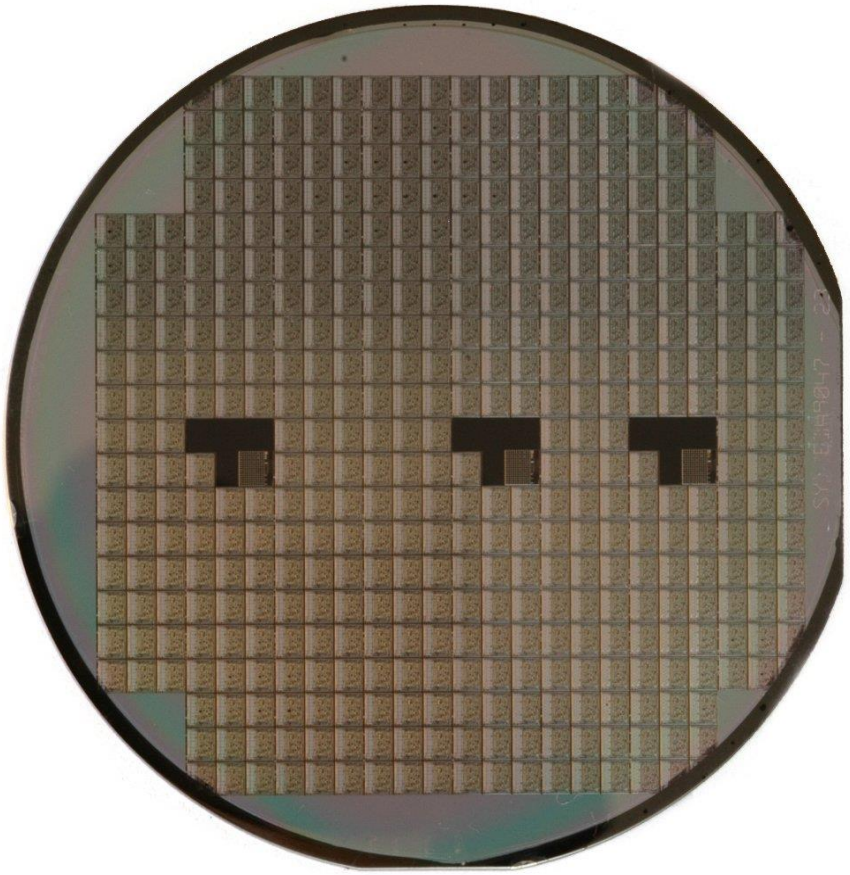
Crystal Lattice
Diamond Structure



0.54 nm

From Wafer to Chips

Patterned Silicon Wafer



Final Microchip