

PROPERTY-BONDING RELATIONSHIPS

<u>Properties</u>	<u>Small Molecule Covalent Substance</u>	<u>Network Covalent Substance</u>	<u>Electrovalent Substance</u>	<u>Metallic Substance</u>
Hardness	Soft	Hard	Hard	Soft or Hard
State at Room Temperature	Gas, Liquid, or Solid	Solid	Solid	Solid
Melting Point	Within 200°C Above or Below Room Temperature	Very High	Well-Above Room Temperature	Room Temperature and Above
Boiling Point	Short Liquid Range (100°C)	Very High	Long Liquid Range	Long Liquid Range (1500°C)
Solubility in Water	Usually Insoluble	Insoluble	Often Soluble	Insoluble
Solubility in Oils	Usually Soluble	Insoluble	Insoluble	Insoluble
Conductivity for Electricity	Nonconducting	Nonconducting	Conducts when melted or in solution	Conducts in solid and in melt
Chemical Reaction on Conduction	Nonconducting	Nonconducting	Chemical reaction occurs when current passes	No chemical reaction on passage of current
Conductivity for Heat	Insulator	Insulator	Insulator	Conductor
Opacity	Transparent	Transparent	Transparent or Translucent	Opaque
Reflectivity	—	—	—	Metallic Luster
Typical Example	Methane (CH ₄)	Quartz (SiO ₂) _x Diamond (C _x)	Sodium Chloride (NaCl)	Aluminum (Al)