

SCH 3A1 Worksheet

PHYSICAL PROPERTIES

1. Explain the difference between a macromolecule and a molecule of discrete size. What types of bonding results in macromolecules? Give three different examples of substances that exist as macromolecules. How many atoms or ions are present in a sodium chloride "molecule"?
2. What type of bonding exists within a molecule of discrete size? Give some examples of substances that exist as discrete covalent molecules. How many atoms are present in a water molecule, an ammonia molecule (NH_3) a glucose molecule ($\text{C}_6\text{H}_{12}\text{O}_6$)?
3. A molecular formula is used to describe a discrete covalent molecule, while an empirical formula is used to describe a macromolecule. What does a molecular formula tell you? What does an empirical formula tell you?
4. What generalization can be made about melting and boiling points for a substance and the forces of attraction that hold that substance together? Ionic solids, covalent network solids and metallic solids all have relatively high melting and boiling points while discrete covalent molecules have lower melting and boiling points. What does this tell you about the forces that hold macromolecules together versus the forces that hold together a solid composed of discrete covalent molecule units?
5. Explain why a discrete covalent molecule such as water forms a solid below a temperature of 0°C while a substance such as methane CH_4 , oxygen gas O_2 or nitrogen gas N_2 do not form a solid until cooled to well below -150°C . What is the fundamental difference between water and the other molecules mentioned?
6. What is the physical property of cleavage? What types of compounds exhibit the property of cleavage? Explain why these molecules have this property.
7. Why are metals malleable (bend when stressed)? Why do ionic solids and covalent network solids crack or shatter or cleave when stressed rather than bend like metals.
8. What must be present for electrical conduction to occur? Why are metals good electrical conductors? Why are solutions of ionic compounds electrical conductors while solid ionic compounds are not. Why are covalent network solids unable to conduct electricity? Why are solutions of discrete covalent molecules non-conductive?