# Classification of Matter According to Forces

| | All Matter | | | | | |
|---|---|---|---|---|---|---|
| Molecule Type | Macromolecules | | | Discrete Covalent Molecules | | |
| Intramolecular Force Type | Covalent Bond | Ionic Bond | Metallic Bond | Covalent Bond Only | | |
| Intermolecular Force Type | N.A. | N.A. | N.A. | Hydrogen Bond | Dipole interaction | van der Waals Force |
| Relative Strength | all about the same – 100 | | | 10 | 3–5 | 1 |
| Examples of solids | diamond ($C_n$), Quartz ($SiO_2$) | table salt (NaCl), MgS, $K_2O$, $AlCl_3$ | gold, silver, iron, alloys such as steel or titanium-aluminum alloy | ice, benzoic acid (a carboxylic acid) | ? | wax (an alkane), moth balls (an alkene) |
| Examples of liquids | very rare at room temperature (mercury is an example of metal),<br><br>solids of ionic and metallic solids go through a liquid phase when heated, during which aspect of the bond are still in place<br><br>solid of covalent solids frequently turn directly to a vapour (at very high temperatures in excess of 3000 $^{o}C$ | | | water, ethyl alcohol, acetic acid | ether, formaldehyde, acetone, carbon disulphide | hexane, 1-hexene, cyclohexene, benzene (an aromatic ring), gasoline (mixed hydrocarbons) |
| Examples of gases | once a gas, all bonding forces have been overcome | | | once a gas, all intermolecular forces have been overcome (no longer present), however, the intramolecular covalent bonds are still as present as ever, i.e water vapour is still $H_2O$ in units | | |