Comparing Physical Properties of Ionic and Molecular Covalent Compounds

Ionic compounds	Molecular compounds
takes place between metals and non-metals	takes place between non-metals and non-metals
form ionic bonds as a result of electron transfer from the metal to the non-metal	form covalent bonds as a result of sharing of electron pairs
ionic bond is a result of the forces of attraction between positive ions, (cations) and negative ions (anions). 3-D crystal lattice structure is formed, attractive forces are maximized and repulsive forces are minimized in the 3-D lattice sturcture	Electrons are shared to form a stable octet. Covalent bonds within the molecule are very strong, (i.e. intramolecular forces), however weak attractive forces between the molecules, (i.e. intermolecular), hold the molecules together.
strong attraction throughout the structure (crystalline lattice structure)	covalent bonding between the atoms is strong, (why?), but attraction between the molecules, (why?) is weak
high melting points due to *strong ionic bonds* that spread throughout the 3-D crystal lattice structure	usually low melting point, due to weak forces of attraction between the molecules, (intermolecular forces)
high boiling points * strong ionic bonds* Due to:	usually low boiling points. Due to:
hard but brittle * strong forces of attraction* Brittle due to:	soft; because:
good conductors of electricity in the liquid state, (i.e. molten state), or in aqueous solution, (but not in the solid state). Why?	poor conductors of electricity even when in a liquid state. Why?
solid at room temperature. Why?	usually coloured soft waxy solids, liquids or gases at room temperature. Why?
soluble in a polar solvent such as water. Why?	usually insoluble in a polar solvent.