


# Chemical Bonding:

## The Formation of Compounds



It's time to talk about Bonds...  
Chemical Bonds

007

The slide features a white background with a blue gradient at the bottom. On the right, a black silhouette of a man in a suit holding a gun is shown. A red speech bubble points to the man, containing the text 'It's time to talk about Bonds... Chemical Bonds'. Below the man, the number '007' is written in a red, stylized font.

## Why do elements form bonds?

- ▶ All atoms want a full outer energy level (8 e<sup>-</sup>)
  - Some exceptions want 0 or 2 ve-
- ▶ Done by *losing, gaining, or sharing* electrons to obtain an octet.
- ▶ There are three different types of bonds that can be formed between elements...

## Bonding

- **Ionic bond (formula units)**
  - Between metal and a nonmetal
  - Transfer electrons
  
- **Covalent bonds (molecules)**
  - Between 2 nonmetals
  - Share valance electrons
  
- **Alloy (metallic “bond”)**
  - Two metals just mix
  - Don’t chemically bond or react

## Properties of Ionic Compounds

- Ionic compounds exist as crystals.
  
- A crystal is a regular, repeating, three-dimensional arrangement of positive and negative ions (known as a *crystal lattice*.)
  
- Held together by strong electrostatic forces (opposites attract).
  
- Identifiable properties:
  - very high melting points
  - hard but brittle (shatters when hammered)
  - ions cannot move in the solid state
  - when dissolved in water or melted to liquid state, ions dissociate and form *electrolytes*

## Properties of Covalent Compounds

- ▶ The forces of attraction are much weaker than those of ionic bonds.
- ▶ Molecules melt at low temperatures.
- ▶ Can not conduct electricity in solution.
- ▶ Diatomic molecules
  - Elements with strong electronegativities that bond with themselves
  - “Super 7”
  - $\text{H}_2$ ,  $\text{N}_2$ ,  $\text{O}_2$ ,  $\text{F}_2$ ,  $\text{Cl}_2$ ,  $\text{Br}_2$ ,  $\text{I}_2$

