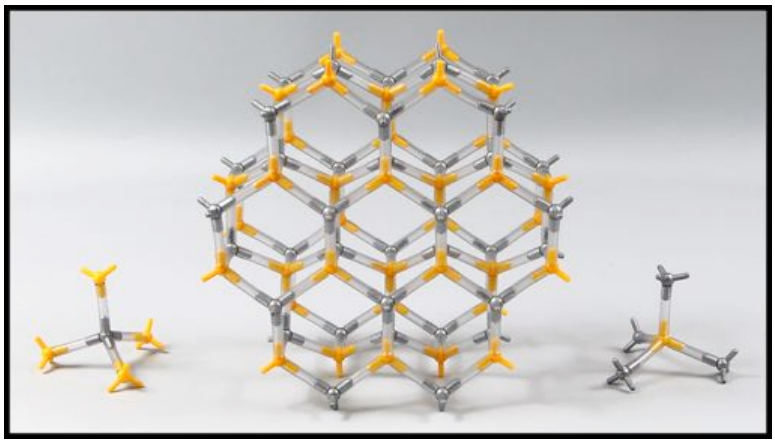
Super Models



Wurtzite (Zinc Sulfide)

Molecular Model Kit

Ryler Enterprises, Inc.

Recommended for ages 10 - adult.

Caution: Atom centers and vinyl tubing are a choking hazard. Do not eat or chew model parts.

Kit contents:

43 silver 4-peg zinc ion centers
43 yellow 4-peg sulfide ion centers
122 clear, 1.25" bonds

Related Kits Available

Cesium Chloride (CsCl)
Fluorite (CaF_2)
Sodium Chloride (NaCl)
Zinc Blende (ZnS)

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E-mail: etishler@rylerenterprises.com
Website: www.rylerenterprises.com
Address: 5701 1st Street, Lubbock, TX 79416

Background Information

Wurtzite is made of tetrahedrally arranged Zinc and sulfide ions. Each zinc ion is surrounded by four sulfide ions, and each sulfide ion is surrounded by four zinc ions. This gives wurtzite a 4:4 coordination.

Wurtzite is the less common cousin of Sphalerite (zinc blende) which has a greater distribution in nature. Sphalerite and wurtzite are both zinc sulfide with the same formula, ZnS; however, they have different crystal structures.

Wurtzite forms crystals which belong to the hexagonal system. The hexagonal system is based on one major axis and has a six fold rotational axis. Zinc blende is a member of the cubic lattice system.

Assembly Instructions

1. Connect three silver zinc ions to three yellow sulfide ions forming a hexagon. (Fig. 1)

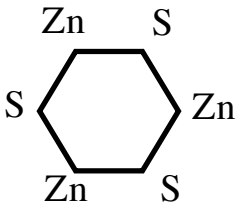

Fig. 1

2. Set it on the table. Adjust it so that the three sulfides touch the table and the three zinc ions are raised. (Fig. 2) The three raised atoms should have a peg pointing straight up.

Fig. 2

3. Continue connecting alternating zinc and sulfide ions to this hexagon forming six more hexagons (Fig. 3). Follow the same pattern as in step 1 with the sulfide ions pointing down and zinc ions pointing up.

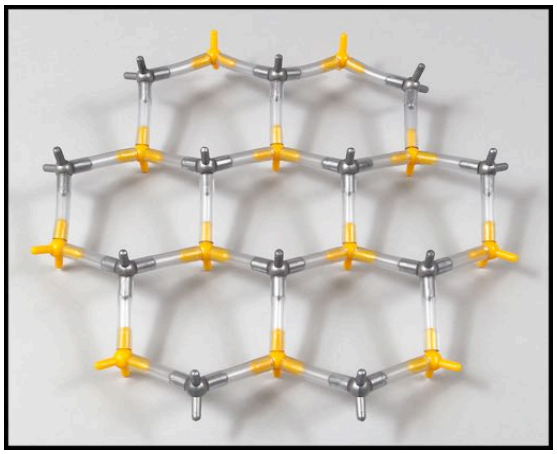

Fig. 3

4. Attach tubes to the 12 pegs of the silver ions pointing up on the layer just completed. See Fig. 4.

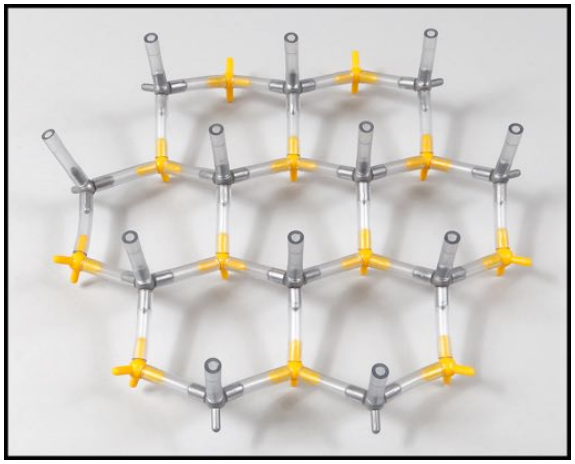

Fig. 4

5. Make two more copies of the structure assembled in step 3. Attach the zinc ions' pegs (which point up) of one layer to the sulfide ions which point down of another layer. Notice that the hexagons of one layer are lined up with hexagons of the next layer (Fig. 5) Repeat this procedure with the third layer (Fig. 6)

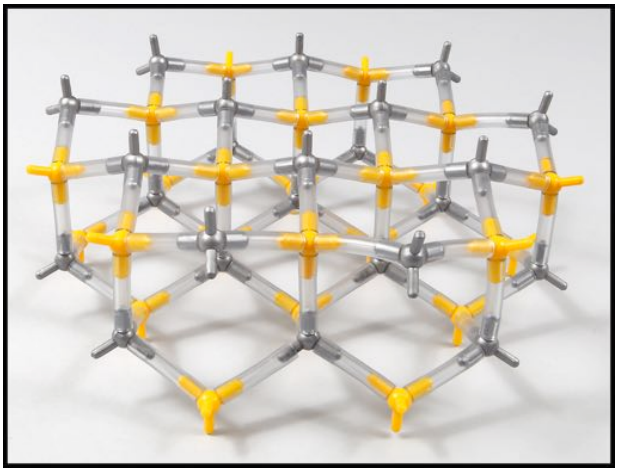

Fig. 5

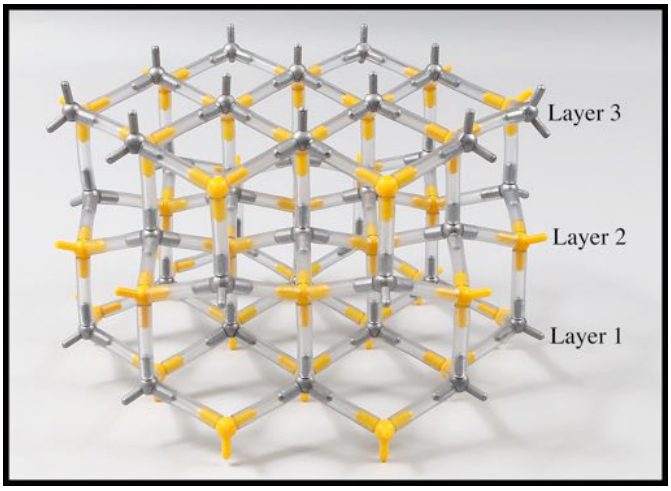

Fig. 6

6. Fig. 7 shows the three layers in register.

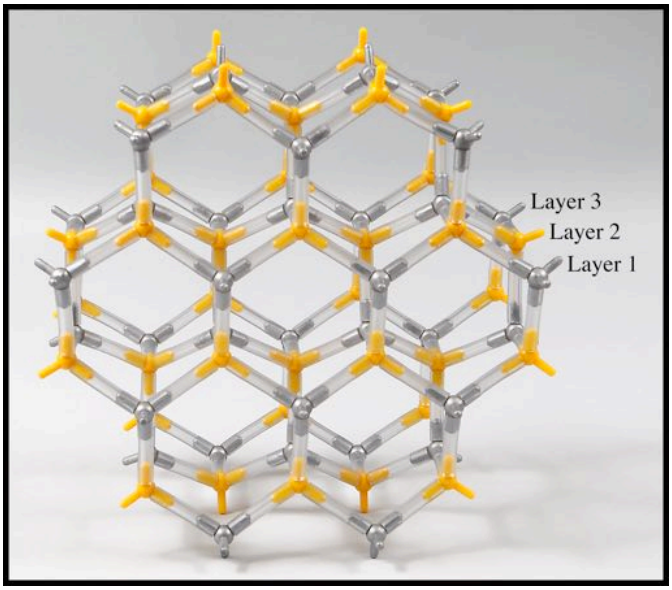

Fig. 7

7. Surround one zinc with four sulfides to form a separate model to show the cation coordination number of four (Fig. 8). Surround one sulfide with four zinc ions to form a separate model to show the anion coordination number of four (Fig. 9.

Fig. 8

Fig. 9

8. A unit cell of wurtzite is shown below in Fig. 10.

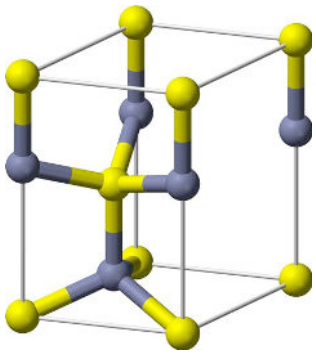

Fig. 10