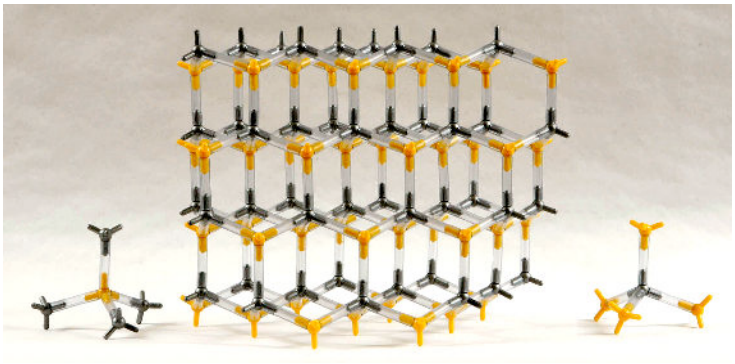
Super Models



Sphalerite (Zinc Blende)
Crystal Lattice 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:

50 silver 4-peg zinc ion centers
50 yellow 4-peg sulfide ion centers
140 clear, 1.25" bonds

Related Kits Available:

Cesium Chloride (CsCl)
Fluorite (CaF_2)
Sodium Chloride (NaCl)
Wurtzite (ZnS)

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Address: 5701 1st Street, Lubbock, TX 79416

Background information

Sphalerite (which is also known as zinc blende) 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 sphalerite a 4:4 coordination number (C.N.) .

Sphalerite is an important ore of zinc and is also an attractive mineral specimen. It can have excellent luster and can be associated with many beautiful colored minerals.

Sphalerite and wurtzite are both zinc sulfides with the same formula (ZnS). However, what makes them different minerals is that they have different crystalline structures.

Zinc Blende Assembly Instructions

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

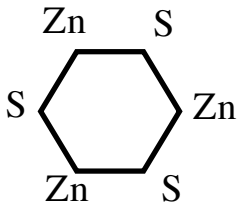

Fig. 1 Sulfer and zinc hexagon.

2. Set the hexagon on a 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. This is called a chair conformation.

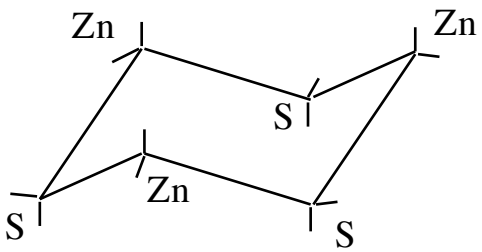

Fig. 2 The hexagon in a chair conformation.

3. Continue connecting alternating zinc and sulfide ions to this hexagon forming seven more hexagons. (Fig. 3) Follow the same pattern as in step 1 with the sulfide ions pointing down and zinc ions pointing up. This arrangement is the top layer. The small circle in the lower right hand corner is a sulfide ion.

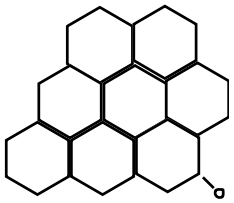

Fig. 3 The top layer.

4. Make another copy of the hexagon assembled in step 1, and continue connecting alternating zinc and sulfide ions to this structure forming eight more hexagons. The layer that you have just made will fit in the middle of the completed crystal. (Fig. 4)

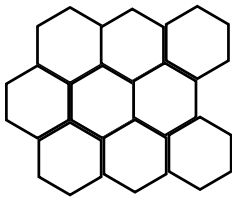

Fig. 4 The middle layer.

5. Construct the bottom layer starting out with another hexagon made as in step 1. Add sulfide and zinc ions until you have a structure which looks like Fig. 5. The filled in circle at the top right is a zinc ion.

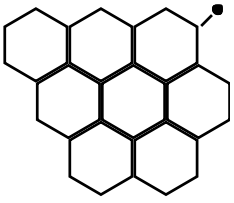

Fig. 5 The bottom layer.

6. Attach tubes to the zinc ions pegs which point up in the bottom and middle layers.

7. Now place each one of the sulfide ions of the top layer over a tube on a zinc ion of the middle layer, and push to form a bond. Fig. 6 below shows how to line up the top layer over the middle layer.

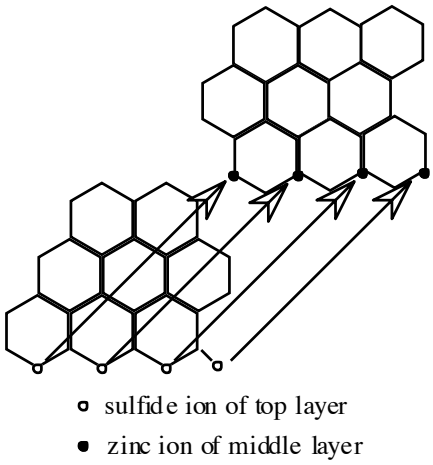

Fig. 6 Placing the top layer over the middle layer.

8. The middle layer can now be put in place over the bottom layer and bonded to it. Align the sulfide ions of the middle layer over the bonds pointing up from the bottom layer, and push the layers together. (Fig. 7)

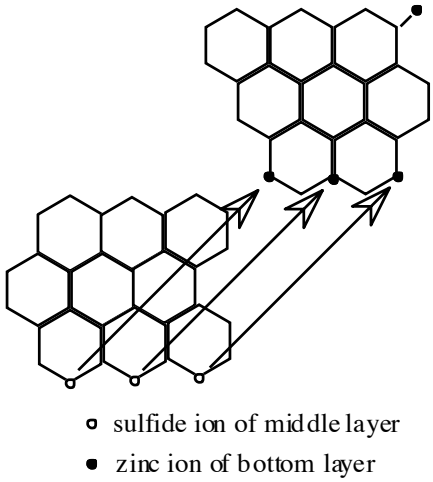

Fig. 7 Placing the middle layer over the bottom layer.

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

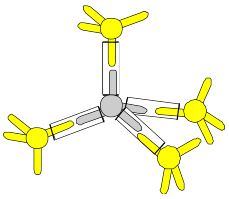

Fig. 8 Cation C.N. 4.

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

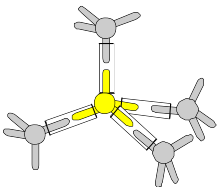

Fig. 9 Anion C.N. 4.