

CHAPTER 2

HANDOUT

Investigation 2.A: Building Ionic Crystals

BLM 2.1.4

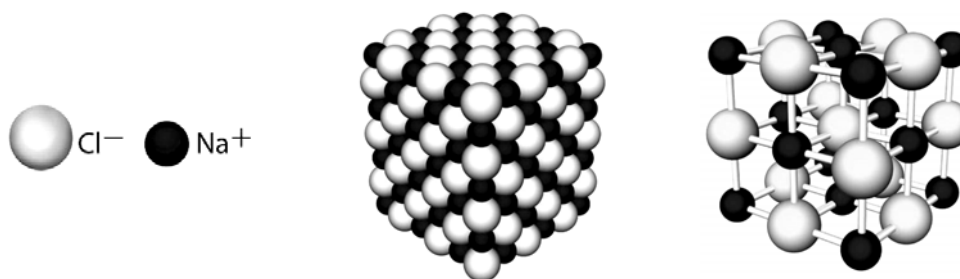
Seeing a two-dimensional image of a three-dimensional structure often does not give you a clear picture of the object. Building models of crystal structures will provide a much clearer understanding of the structure of ionic compounds.

Materials

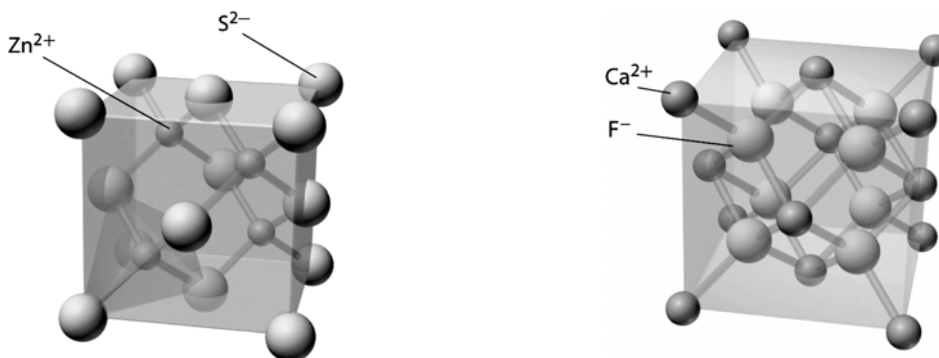
- polystyrene balls of two different sizes or gumdrops in two different sizes or colours
- toothpicks

Procedure

1. Carefully study the arrangement of the ions in sodium chloride in the figure below.



Also note the arrangement of ions in zinc sulfide and calcium fluoride below. Discuss with your partner how the ions are arranged in the three different types of crystals.



2. If you are using polystyrene balls, decide which size should represent sodium and which should represent chloride in a sodium chloride crystal. If you are using gumdrops, assign one colour to sodium and another colour to chloride.
3. Build a model of at least two unit cells of a sodium chloride crystal.
4. Repeat Procedure Steps 2 and 3 for a zinc sulfide crystal.
5. Repeat Procedure Steps 2 and 3 for a calcium fluoride crystal.
6. After you and your partner are satisfied that you have built your models correctly, compare your models with the models of another team. If your models are not the same, discuss the differences in the models with the other set of partners.

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7. As a class, agree on the correct model for each type of crystals.

Analysis

1. What aspect did you find most difficult about building your models?
2. In general, were the class models nearly all the same? If not, what do you think caused different partners to build their models differently?
3. What do you think you can learn about crystals by building models that you cannot learn by looking at two dimensional pictures?

Conclusion

4. How well do you think your models represent real crystals? Describe ways in which your models are similar to real crystals and ways in which they are different from real crystals.