Name_____ Period _____ Date _____

STEM Sims

Lesson 4: Conducting Fullerenes

Certain materials are conductors of electricity, while others act as insulators and inhibit the movement of electrons. The chemical structure of a molecule generally gives rise to its ability to act as a conductor or an insulator. Can you conduct an investigation to determine if C_{60} is an insulator or conductor and how temperature affects conductivity?

Doing the Science

1. Start the Buckyball Simulation by clicking on the "Sim" tab.
2. Click on the fullerene (C_{60}) container and drag a chunk to the empty beaker on the tabletop.
3. Click the "On" button on the *Conductivity and Cooling* device. If "No Data" appears, the material is an insulator. If data does appear in the graph area indicating the material is a conductor, click the graph area to enlarge the graph for detailed study. Note and record in Table 1 the conductivity properties of C_{60}.
4. Click the "X" in the upper right-hand corner of the Graph screen to return to the lab testing area.
5. Click the "Reset" button at the bottom of the screen.
6. Repeat steps 2 – 4, except test the remaining materials and combinations described in Table 1 instead of using fullerene. Make sure to note and record your data in Table 1.

Table 1. Conductivity

Sample	Conductor or Insulator?
(Fullerene) C_{60}	
Water	
Benzene	
Potassium Doping	
(Fullerene) C_{60} & Water	
(Fullerene) C_{60} & Benzene	
(Fullerene) C_{60} & Potassium Doping	

Do You Understand?

1. On the back of this paper, sketch the graph(s) for the materials and/or combinations that were conductors. Make sure to properly title and label all graphs and axes.

2. For the materials and/or combinations that were conductors, describe how changing the temperature changed the electrical conductivity properties of the substances.