Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**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 C60 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 (C60) 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 C60.

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) C60 |  |
| Water |  |
| Benzene |  |
| Potassium Doping |  |
| (Fullerene) C60 & Water |  |
| (Fullerene) C60 & Benzene |  |
| (Fullerene) C60 & 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.