**Crystallization: Purification of Crude Benzoic Acid and Phenanthrene**

**Data:**

*Mass of Benzoic Acid initially measured:*

* *0.100g*

*Mass of Phenanthrene initially measured:*

* *0.100g*

*Mass of crystallized Benzoic Acid acquired:*

* *0.087g*

*Mass of crystallized Phenanthrene acquired:*

* *0.049g*

*Melting Point Ranges:*

* Benzoic Acid
  + Trial 1
    - 122.1 – 123.5 C
  + Trial 2
    - 122.0 – 123.4 C
* Phenanthrene
  + Trial 1
    - 100.01 – 102.50 C
  + Trial 2
    - 98.9 – 102.2 C

**Calculations:**

*% Yield:*

* Benzoic Acid:
* Phenanthrene:

*Average Melting Point Ranges:*

* Benzoic Acid
* Phenanthrene

**Discussion and Results**

The main purpose of this particular lab experiment was to recrystallize the benzoic acid and Phenanthrene, which was separated from the previous lab experiment. This goal was partially accomplished. This is because the amount of benzoic acid recovered was 87% and 49% of Phenanthrene. With a melting point avg. range of 122.05 – 123.45 C and 99.455 – 102.35 C, respectively. This is close to the melting points of Benzoic Acid and Phenanthrene, 122.41 C and 101 C respectively. Hence, proving that the compounds recrystallized were pure. However, not 100% was recovered. Close to perfect was benzoic acid with 87%, with very slight impurities. Also some of the crystallized compound was lost during the vacuum process. Regarding Phenanthrene, only 49% was recovered, also it had more impurities than benzoic acid, as the range was wider. In addition, it wasn’t as cool as it was suppose to be when the vacuum process occurred.

In comparison to the melting points before and after recrystallization are odd, such as that of benzoic acid, 121.0 – 122.5C (Before) and . The initiation of melting was 121.0 before and 122.05 after, giving a 1-unit difference. While, for Phenanthrene, 98.01 -101.1C (before) and , which is quiet similar. Overall, I believe, the compounds were more pure before than they were now due to their melting point ranges (before and after)

Limitations could be that the cold hexanes weren’t as cold, allowing some of the crystals to be passing through the filter paper. In addition, maybe, having the Phenanthrene to cool down for longer than 15 minutes could have added it to loose some of the crystals. In addition, some of the crystals could’ve passed through without having been noticed because they were tiny and very close to being transparent. Also the benzoic acid and Phenanthrene used in this lab was different that of the previous lab as there wasn’t enough for the crystallization process.

The experiment could be improved in the future by measuring the temperature of the cold hexanes, making sure its cold enough or around the required temperature. In addition, a larger amount of benzoic acid should’ve been used in the previous lab in order to have sufficient amount for the recrystallization process, as that keeps the variables constant.