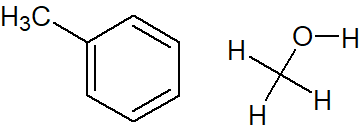
**CH 245: ORGANIC CHEMISTRY 1 LABORATORY (Fall 2019)**

**Title:**

1. **Purpose: (1 point)**

The purpose is to determine the effect on the boiling point of a solution of toluene with the addition of methanol through the use of simple distillation to determine boiling point.

1. **Drawing of structure of the main compound or balanced chemical equation if synthesis is performed: (1 point)**



Toluene Methanol

**3. Reagents and the major product (up to 6 points)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **M.W.**  (0.5 pts) | **Density**  (0.5 pts) | **Amount (grams/mL)**  (0.5 pts) | **Moles**  (0.5 pts) | **Hazards/Precautions**  **(MSDS data) and melting point or boiling point** (2 pts) | **Waste Disposal**  **(aqueous or organic)** (2 pts) |
| Toluene | 92.14 | 0.87 g/mL |  |  | Skin and serious eye irritation, highly flammable liquid and vapor, B.P. 110.6°C | Organic |
| Methanol | 32.04 | 0.792 g/mL |  |  | Highly flammable liquid and vapor, toxic in skin, inhaled, or swallowed, B.P. 76.7°C | Organic |

**4. Procedure (up to 2 points)**

|  |  |
| --- | --- |
| **Procedure** | **Observations and Lab Data** |
| A summary of the procedure done with bullet points) | Color changes, exothermic or endothermic reactions, gas generation, etc.; tare weights for flasks, etc. |
|  |  |

**5.** Results; include actual yield in grams and % yield.

**Results (need to get signed by instructor or TA):**

The overall effect of adding methanol to toluene is an overall lowering of boiling point below both substances’ boiling points.

**Conclusion**

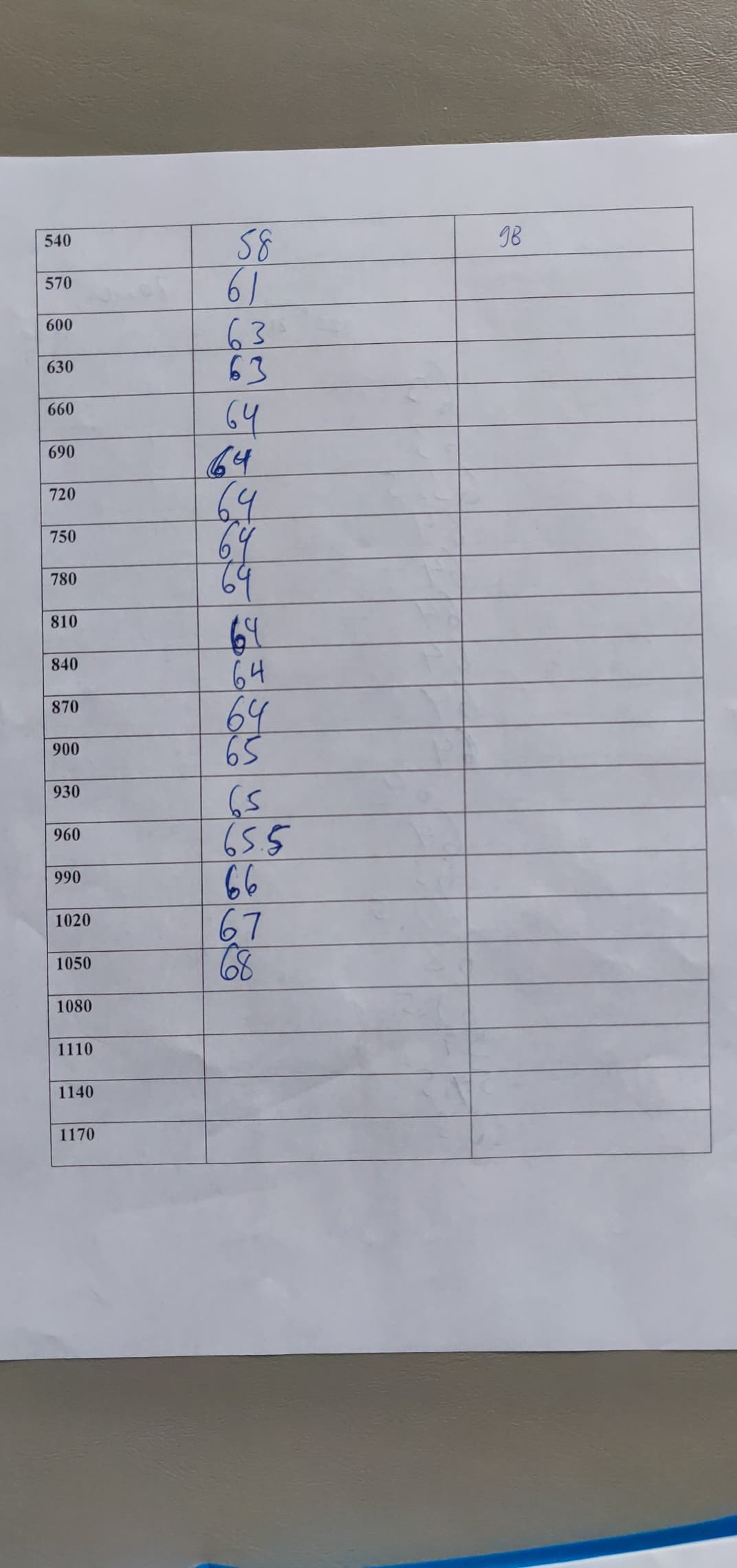
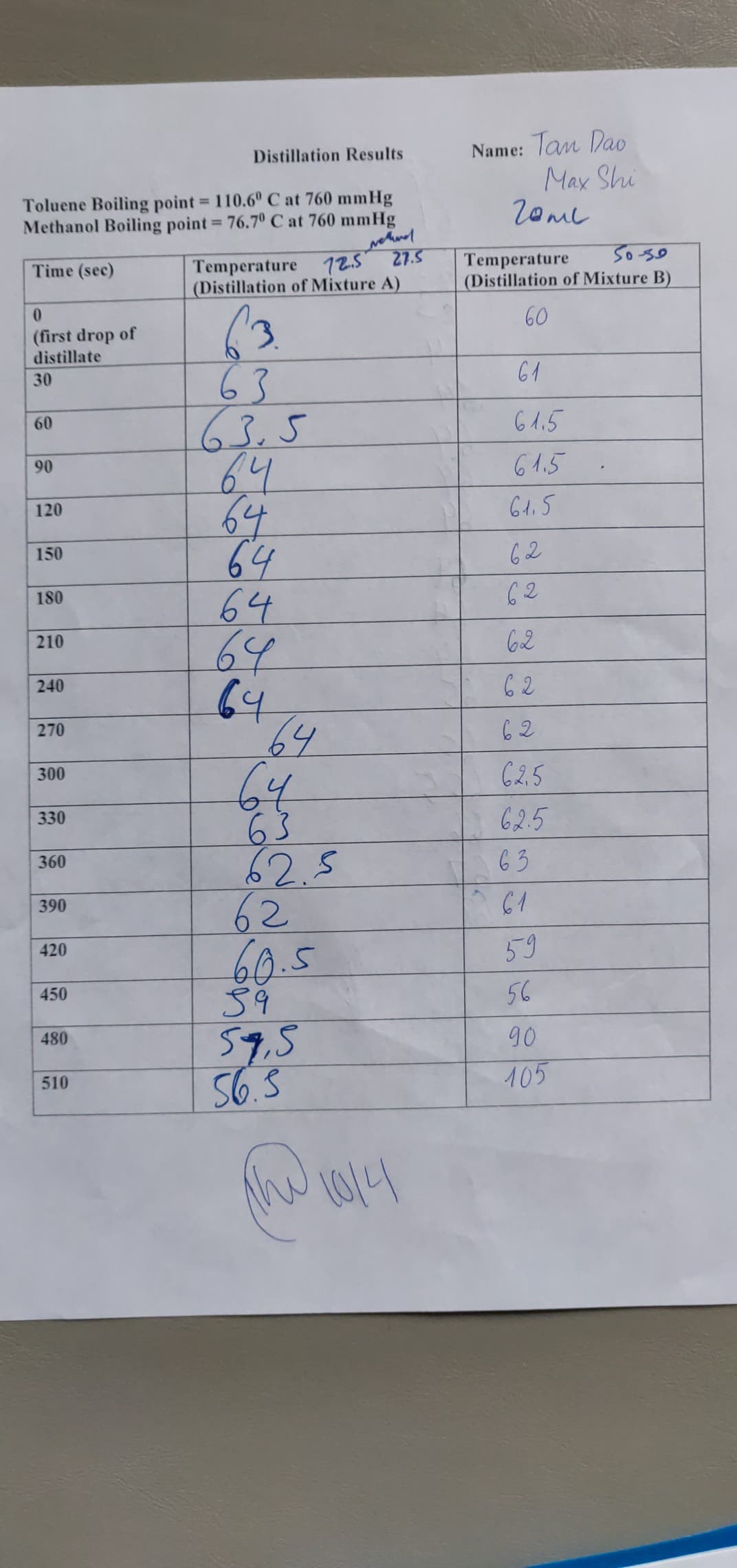
I accomplished in this lab a determination of which mixture out of two substances is azeotropic. Through the lab, I learned about azeotropic mixtures, how to create them, and how to tell whether a mixture is azeotropic by distillation. An issue I had during the lab was a pause of boiling and a drop in the temperature of the azeotropic mixture during the distillation when there was still liquid left in the boiling flask, which caused the dip in temperature around 480 seconds into the distillation. Thus, for the future, I will ensure that the heating makes good contact with the boiling flask in order to avoid a loss of heating. The practical application of this lab is to be able to lower the boiling point of a compound or to be able to boil off an impurity by lowering the boiling point of the substance as a whole.

**Post Lab Questions**

The two ways are to form an azeotropic mixture or to turn the distillation into a vacuum distillation.

At an azeotrope point, the ratio of substance boiling off between the two substances in the mixture are the same, and therefore, the same ratio of substances is maintained in solution, thus keeping the boiling point constant.

No, an azeotropic mixture cannot be separated into pure individual compounds by distillation.

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