**Data collection**

* Mass of benzophenone = 0.4520g
* Yield of Benzophenone = 0.4520 g
* Mass of crude product= 0.1010 g
* Mass of watch glass = 20.1972 g
  + With crude product = 20.7445 g
* Melting point for crude product = 42C-51.5C
* Melting point for purified product= 64-68.5C

**Conclusion**

The main purpose of this lab was to use NaBH4 to reduce benzophenone to benzhydrol (reduction of ketones), this was accomplished. A relatively pure substance was formed through the reduction of ketones. The purpose of NaBH4 to turn the carbonyl into an alcohol and hydrogen attached to the cyclohexane rings. Next, Sodium Borohydride was to be added slowly in sets due to the fact the reduction of ketones is exothermic, hence, if it was added all at once it would’ve heated up the mixture too much. HCl was used in the reaction to speed up the reaction rate between sodium borohydride and water. After all the sodium borohydride is reacted, the HCl acid was added to eliminate the remaining NaBH4 in the solution, allowing it to not affect the isolation of the product. It was also supposed to be added slowly because of the reaction being exothermic, same reasoning as of the addition of sodium borohydride.

It appears that there were very few contaminants in the purified product as the melting point range was between 64-68.5C. The possible contaminants could’ve been a caused due to not allowing the crystals to be completely formed before vacuuming it.

The FTIR run shows that the benzyhydrol as a product, the major IR peak correlates to the benzhydrol in the alcohol group. If there was unreacted benzophenone then there would be carbonyl peak which there wasn’t any signs of in the IR spectrum. Possible impurities could be water and hexanes; they wouldn’t show up on the IR spectrum since they blend in the characteristics of the benzyhydrol spectra. A couple of limitations could be that when the IR spectrum was underway, it was supposed to be done as quickly as possible since the solution evaporated extremely quickly. Thus, things could’ve gone wrong when things were done in a hurry.