**Nucleophilic Substitution: Synthesis of *tert*-Butyl Chloride**

**Observations**

* Accidently surpassed the 15 min time limit, was 16 mins and 12 seconds
* A slight aqueous layer might’ve been added to the organic layer at the time of separation.
* After shaking the funnel, venting wasn’t properly conducted. I vented it once after shaking it, and then I shook it again but forgot to vent it again. No explosions occurred, so I think it was okay.
* It was unclear to me on the amount of anhydrous sodium sulfate to use in order to dry the organic layer. Thus, I consulted the T.A and he advised that the amount I added was alright.
* While doing the Silver Nitrate test, the white precipitate took a little while to appear, I was expecting it to come out immediately, however it took around 5-8 seconds.

**Calculations**

* Mass of product: 0.4061g

**Discussion and Results**

In conclusion, the main purpose of this particular lab experiment is to prepare 2-chloro-2-methylpropane from 2-methyl-2-propanol by using HCl as a hydrogen halide. The final mass of the product was:0.4061g. To verify that the end product was infact 2-chloro-2-methylpropane, IR spectroscopy was done. In the chart attached to this lab report, you could see there are alkane peaks at 2984cm-1, 2928.23cm-1 , and 1457 cm-1; also there was proof of a chlorine group in the product with the following peak: 810 cm-1, identifying this product as 2-chloro-2-methylpropane (also there was absolutely no sign of an alcohol peak in the graph). If there wasn’t a peak for the functional group: alcohol, then to my knowledge, this synthesis was successful. In addition, while performing the Silver Nitrate test, there was a white precipitate, verifying that the reaction took place and synthesis of tert-butyl chloride was successful.

Some limitations to this lab could be that the time required was 15 minutes, I surpassed it by 1 min and 12 seconds according to my watch. That might result is less amount of product. Also when separating the two layers, the organic and aqueous, it is nearly impossible to separate them perfectly by the help of the naked eye. There could’ve been a very tiny mixture of the two layers in the product that wasn’t visible to the naked eye, In addition at the time of drying the organic layer with anhydrous sodium sulfate, it was unclear what amount of sodium sulfate to be added. I consulted the T.A and he advised that the amount that I’ve added is sufficient, thus, I went with it. However, I still wasn’t sure that it was that specific amount or a little less.