**Halogenation of Alkanes: Relative Rates of Free-Radical Bromination**

**Discussion and Results**

The main purpose of this particular lab experiment was to halogenate various different alkanes (different structures). From the pre-lab, it was expected either the cyclohexane or tert-butyl to take the longest. It was decided that the tert-butyl would take the longest time to react, while cyclohexane would still take a lot of time but not as much as the tert-butyl. This was confirmed with Trial 2. In which the cyclohexane took 46 minutes and 30 seconds to decolorize, while the tert-butyl was still dark brownish orange color at 47 minutes. Trial 1 was inconclusive as tert-butyl decolorized (sign of bromine reaction taking place) before cyclohexane, which didn’t make sense. The possible errors that could’ve occurred to allow this sort of results for Trial 1 could be uneven amount of Bromine and the alkanes in each vial, or worse case scenario, they were mislabeled. However, there were some results that were consistent among the two trials: Cumene was the very first one to react (21s T1 and 1:12 min T2); Ethyl benzene was the second one to react (2:49 min T1 and 1:44 min T2); Toulene was the third one to react (3:31 min T1 and 3:50 min T2); and Methyl-cyclohexane took a long time and ended up in 4th place according to Trial 2 with 45:07 min (making sense with the cyclohexane structure) while in Trial 1 it reacted in 2:20 min, which was extremely off.

In conclusion, Trial 2 was authentic according to the expected results while Trial 1 could’ve had mislabeled vials or uneven amounts of bromine in it. Thus, Trial 2 was successful in accomplishing the principle goal of this lab experiment.