

CHEM 321: Lab Report Experimental Section: Bad vs. Good

Here is what NOT to do in your report:

Mix 13.6 g 1-bromobutane and 30 mL anhydrous diethyl ether into a 125 mL separatory funnel and add 5 mL of the solution to 2.5 g of Mg in a 100 mL round bottom flask. Once boiling starts, add 10 mL of anhydrous diethyl ether through the condenser. Once boiling decreases, add the remaining 1-bromobutane / anhydrous diethyl ether solution dropwise from the separatory funnel. Then, heat the mixture for 5 minutes and, then, cool to 0 °C. Then, add 6.61 g of acetone in anhydrous ether dropwise to the cooled reagent to oxidize the acetone. Then, cool the product, and add a solution of conc. H₂SO₄ in ice. Pour the product and 30 mL of diethyl ether into a 125 mL separatory funnel which is fitted on a ring stand. Make sure to vent the separatory funnel often and shake the separatory funnel vigorously to get good separation. Drain the lower layer into a 250 mL beaker, and discard this lower layer. Add about 20 mL of NaHCO₃ to neutralize acid, and shake vigorously, with venting, again. Again, drain the lower layer into a 250 mL beaker, and discard this lower layer. Drain the upper layer into a dry 125 mL Erlenmeyer flask, check carefully for visible water droplets. Finally, add enough anhydrous CaCl₂ to thinly cover the bottom of the Erlenmeyer flask to absorb the dissolved water. Add your name to the side of the flask and store in your lab drawer for one week.

Here is a GOOD report:

All glassware was kept anhydrous to minimize unwanted reactions. A mixture of 1-bromobutane (13.6 g, 0.10 mol) and anhydrous diethyl ether (30 mL) was prepared. A small portion of this solution (5 mL) was mixed with Mg (2.5 g, 0.10 mol). Once boiling started, anhydrous diethyl ether (10 mL) was added to keep the Grignard reagent dilute and to minimize production of octane. Once boiling decreased, the remaining 1-bromobutane / anhydrous diethyl ether solution was added dropwise, followed by gentle heating for 5 minutes. The mixture was cooled to 0 °C and acetone (6.61 g, 0.11 mol) in anhydrous ether (15 mL) was added dropwise to form the alkoxide product. A solution of conc. H₂SO₄ (5 mL) in ice (100 mL) was slowly added to form the crude product. The alcohol was extracted into diethyl ether (30 mL). The organic layer was washed with sufficient NaHCO₃ (5 %) to neutralize acid and dried over anhydrous CaCl₂ (1 week).

Notice how much different the good report is to the previous example. Most importantly, the “good” report follows all guidelines in the laboratory syllabus. Additionally, the “good” report is much shorter than the former example, and it still conveys all the necessary information for an experienced reader.