

Introduction to Virtual Chemlab

Virtual Chemlab is a program that duplicates, on a computer, some of the reactions that can be run in the organic chemistry laboratory. The program allows you to select the starting materials, reagents, solvent, and temperature that you desire, then run the reaction and see what happens. When the reaction is complete, you can add work-up solutions to extract the desired products, take TLC's, purify the product by distillation or recrystallization, run IR spectra or NMR spectra, and take melting points - all with the click of a mouse.

Using this program is not a substitute for hands-on experience, but does have several advantages over actual lab work. First of all, we don't have to worry about safety issues - you can try anything you want, and if it explodes, there are cool graphics, but no one gets hurt! This gives you a lot more freedom to experiment than you would have in real life.

Secondly, running one reaction usually takes us an entire lab period, so we don't have the chance to run the reaction several different ways to see how it affects the results. In Virtual Chemlab, you can simply click on the digital clock to advance time - three clicks and three hours have passed! You can run multiple versions of the same reaction in a relatively short period of time to investigate the effects of factors such as temperature, solvent, etc, on the reaction. A nifty little help window tells you what chemicals are actually in the reaction at any given time so that you have a better chance of figuring out what is really going on.

Finally, you don't have to worry about all the physical details of running a reaction - you can't drop any glassware or spill your reaction or add the wrong amount of something or make a bad judgment on whether the sodium sulfate is free-flowing. This gives you the chance to concentrate on understanding why and how a reaction works or doesn't work rather than the physical details of running the reaction. If you take advantage of this learning tool, your understanding of what's going on in a real lab should increase, making it less of a cook-book exercise and more of a learning experience.

With all that said, I should mention that this program isn't perfect - it makes some simplifications that are not realistic for the sake of writing a manageable program, and there are also some possible bugs (results that I can't make any sense of). I'm keeping a list of these to write the program creators about, so let me know if you notice any. As you do these assignments, try not to get hung up on these simplifications or errors as we encounter them.