

Teaching ideas for Option G, *Further organic chemistry*

Questions

Two worksheets of questions are provided:

- the first worksheet deals with the Standard Level part of the syllabus
- the second worksheet is for Higher Level only.

There are also a large number of questions available in the Coursebook and on the accompanying CD-ROM.

Teaching ideas

- The emphasis in this option is very much on writing reaction mechanisms. Students should be encouraged to understand these fully and practice them as much as possible.

Practical activities

Safety

Extreme care must be exercised when carrying out any practical activities in the classroom and a risk assessment should be conducted before carrying out the experiments.

Demonstrations

- Although the addition of HCN to an aldehyde or ketone should not be demonstrated, the addition of HSO_3^- can be. A procedure is given at:
<http://www.demochem.de/D-Aldehyde-e.htm>
- The addition–elimination reaction of aldehydes and ketones with 2,4-DNPH can either be demonstrated or carried out by students:
<http://faculty.swosu.edu/william.kelly/pdf/ketone.pdf>
http://www.wellesley.edu/Chemistry/chem211lab/Orgo_Lab_Manual/Appendix/Classification_Tests/aldehyde_ketone.html#DNP
http://www.uni-regensburg.de/Fakultaeten/nat_Fak_IV/Organische_Chemie/Didaktik/Keusch/D-DNPH-e.htm
- The relative rates of hydrolysis of bromobenzene and (bromomethyl)benzene can be compared. A few drops of each are put into test tubes containing 2–3 cm³ of ethanol. The test tubes are put in a water bath at about 50 °C and then, when they have reached the correct temperature, silver nitrate solution is added.
- The reactions of ethanoyl chloride with water, ethanol and phenylamine can be demonstrated as test-tube reactions.
- Bromination of methylbenzene can be demonstrated by putting a small amount of methylbenzene in a test tube, adding iron filings and then a few drops of bromine. Test for any gas given off with moist universal indicator paper.
- The reactivity of phenol can be demonstrated by dissolving some phenol in water and adding excess bromine water. A white precipitate of 2,4,6-tribromophenol should form.

Student practicals

- Excellent guides to the preparation of aspirin and paracetamol are on these websites:
http://www.rsc.org/images/Aspirin_tcm18-189278.pdf
http://www.rsc.org/images/Paracetamol_tcm18-188311.pdf
- Students can carry out electrophilic substitution reactions:
<http://faculty.swosu.edu/william.kelly/pdf/nitrat1.pdf>
<http://www.mnstate.edu/jasperse/Chem365/Nitration.pdf>
http://www.chem.wisc.edu/courses/342/Fall2006/Experiment_4.pdf
http://d.web.umkc.edu/drewa/Chem322L/Handouts/EXP%207%20nitration_methylbenzoate%20SP2008.pdf

ICT

There are several websites that show animations of organic reaction mechanisms:

<http://www.chemtube3d.com/>
<http://people.usd.edu/~gsereda/computer.html>
<http://ochem.jsd.claremont.edu/tutorials.htm#>

Some of the practical techniques relevant to this topic are described at:

<http://www.rsc.org/Education/Teachers/Resources/practical/>