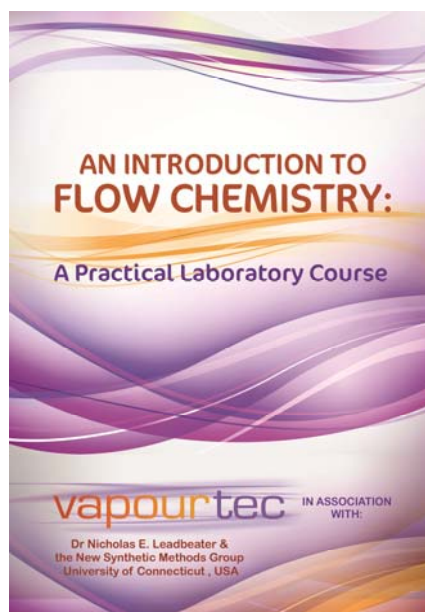


Free Laboratory Teaching Materials available with all new E-Series systems



The new E-Series system from Vapourtec was developed with three key main design aims

- Ease of use
- Robustness
- Affordability

One of the key reasons for this set of requirements is to help bring flow chemistry into University teaching courses, thus enabling students to be more aware of this increasingly important technique.

With this in mind, Vapourtec have developed (in conjunction with the New Synthetic Methods Group at the University of Connecticut) a set of laboratory teaching materials that introduce students to the key concepts of flow chemistry and include practical teaching experiments.

This free to E-Series customers booklet 'An Introduction to Flow Chemistry – A Practical Laboratory Guide' makes it possible to include hands on flow chemistry in the undergraduate chemistry syllabus with minimum effort.

What is included ?

The package consists of 9 different flow reactions each designed to fit within a 3 hour laboratory practical session.

Each experiment includes an introduction and the appropriate background information for students to become acquainted with before starting.

Detailed instructions for correctly setting up the equipment for the experiment are included, in diagrammatic and step by step form.

A simple user guide for the E-Series system is included, telling students what they need to know without requiring that they read a manual.

Step by step instructions for the whole experiment are available in checklist form including all workup

3.5 Reaction 5: Preparation of an Ester:

Oxidation of an Aldehyde to a Methyl Ester

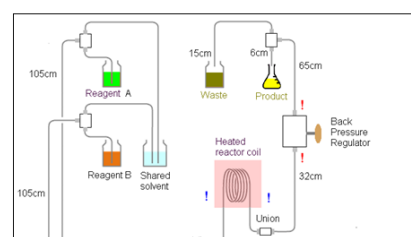
LEARNING GOALS

- To perform an oxidation reaction
- To prepare a methyl ester

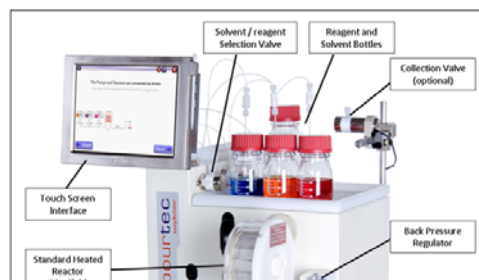
3.5.1 Introduction

In general chemistry courses we are taught that oxidation involves the loss of electrons, often from metals, to form cations. In organic chemistry, oxidation is explained in terms of

- Ensure tubing is connected as shown below.



2.1 Overview



- Once all the reagents have exited the flow unit, the reaction is complete
- Press the "stop reaction" button

Purify the product:

- Obtain a 250-mL Erlenmeyer flask and label it "aqueous phase" and a 250-mL Erlenmeyer flask and label it "organic phase"
- Transfer the contents of the "product" bottle to a 250-mL separatory funnel
- Rinse the "product" bottle with diethyl ether (5 mL) and add the wash to the separatory funnel

About the experiments

Each experiment is designed for a 3 hr laboratory practical session.

With reliable pumping and push button priming the E-Series system ensures that the students can complete the whole experiment in the allotted time and each reaction has been extensively tested (using real undergraduates !) to ensure reliable outcomes if the method is adhered to.

The experiments include the following reactions:

1. Diels-Alder [4+2] Cycloaddition – Preparation of a Bicyclic Lactone
2. Preparation of a Heterocycle – A Paar-Knorr Pyrrole Synthesis
3. Preparation of a Bromoarene – Electrophilic Aromatic Bromination
4. Preparation of a Carbamate – The Hoffmann Rearrangement
5. Preparation of an Ester – Oxidation of an Aldehyde to a Methyl Ester
6. Preparation of a Coumarin – A Knoevenagel Condensation Reaction
7. Preparation of a Cyclopentene: A Ring Closing Metathesis Reaction
8. A Nucleophilic Acyl Substitution Reaction - Preparation of an Ester
9. Preparation of a Biaryl - A Suzuki Cross Coupling Reaction

To request a sample of one of the flow reactions please send an e-mail to

flow-teaching@vapourtec.com.

About the Teaching Materials

There is no charge for the materials – they are freely available to all E-Series owners.

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