Virtual Laboratory Course in Chemical Engineering and Unit Operations (VIPRATECH)
Tutorials, Simulations and Remote Process Control

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Abstract

Being part of the major project "Vernetztes Studium Chemie" VIPRATECH aims at developing Internet based teaching aids to provide the means for a virtual laboratory course in chemical engineering and unit operations.

With VIPRATECH students and other people have the possibility to inform themselves about the theoretical background and the experimental setup before going ahead with the experiment. Additional, VIPRATECH helps to visualize fundamental processes as well as to clarify theoretical concepts needed for the evaluation of the received experimental data. One major advantage is the possibility to deepen one's understanding of the underlying concepts while surfing the net.

VIPRATECH consists of three parts: multimedia text books, interactive simulations and interfaces for observing/controlling real laboratory experiments via the Internet by using a standard web-browser.

The poster discusses the structure and the advantages of VIPRATECH.

Introduction

Being part of the major project "Vernetztes Studium Chemie" VIPRATECH aims at developing Internet based teaching aids to provide the means for a virtual laboratory course in chemical engineering and unit operations.

While VIPRATECH is meant primarily for students taking chemistry, contents are also available for people interested in furthering their chemical knowledge. With VIPRATECH students have the possibility to inform themselves about the theoretical background and the experimental setup before going ahead with the experiment.

Secondly, VIPRATECH helps to visualize fundamental processes as well as to clarify theoretical concepts needed for the evaluation of the received experimental data. One major advantage is the possibility to deepen one's understanding of the underlying concepts while surfing the net.

VIPRATECH consists of three parts: multimedia text books, interactive simulations and interfaces for observing/controlling experiments via the Internet for each element of the laboratory course (heat transfer, adsorption and others).

Multimedia Text Books

Multimedia text books present the underlying theoretical concepts, explain the experimental setup and give detailed instructions on how to use the equipment.

Multimedia elements such as videos, animated films and interactive graphics support the accompanying text.

Interactive Simulations

Interactive simulations for each real experiment has been developed. These simulations can be executed – independent of the location – in shorter time as the real experiment, at any moment during the day.
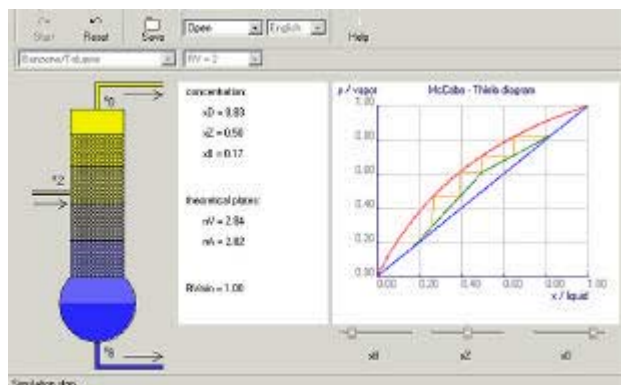

simulation for the rektification experiment

Another advantage is the possibility to simulate processes which otherwise could not be realized – due to financial reasons or because of the risks involved.

Remote Process Control Interface

For the third part of VIPRATECH, a remote access to selected real experiments of our laboratory course via the Internet has been realized including the possibility of remote controlled execution of these experiments.
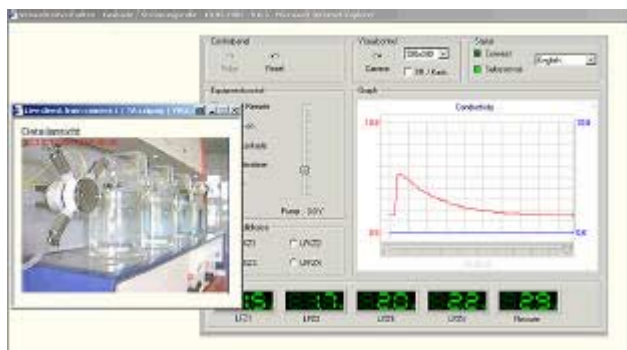
remote control for the resident time experiment

The student controls the experiment using only a standard web browser. Critical data will be collected and evaluated online. It is also possible to observe the experiment live using real-time video.

Based on these innovative methods it should be possible to create a network of remotely controlled experiments.

VIPRATECH:
   http://leipzig.vernetztes-studium.de/

Vernetztes Studium Chemie:
   http://www.vernetztes-studium.de/

Institut of Chemical Technology Leipzig:
   http://techni.chemie.uni-leipzig.de/

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