



MAPR2118 Fluid-fluid separations

[30h+30h exercises] 5 credits

This course is taught in the 1st semester

Teacher(s): Denis Mignon
Language: French
Level: Second cycle

Aims

Gain a practical knowledge of the operating principles, as well as of the selection, sizing and equipment choice methods applicable to unit operations for fluid/fluid separation.

Main themes

- Diffusion theory. Fick's law and Stefan's law. Convective and molecular transfer coefficients. Analogy between heat and mass transfer.
- Continuous and batch distillation of binary and multi-component mixtures. Graphical (McCabe and Thiele) and numerical sizing methods. Simplified ("shortcut") and rigorous methods. Trayed column design (equipment, efficiency and capacity).
- Absorption of one or more components into a liquid, with or without a chemical reaction. Stripping. Packed column hydrodynamics. Different types of packing and absorbers.
- Liquid-liquid extraction. Single stage and multiple stages, with or without reflux. Extractor types and selection criteria. Supercritical extraction.
- Solid-liquid extraction basics (the principles and equipment).
- Using the ASPEN + process simulator for each of the above techniques.

Content and teaching methods

Study of the fluid/fluid separation techniques : gas absorption into liquids, stripping, distillation, liquid/liquid and solid/liquid extraction. For each of these techniques, the following elements will be presented :

equilibrium between phases of interest;
 sizing methods;
 industrial applications and equipment.

The theoretical considerations will be illustrated by practical work sessions relying on the use of the process simulation software ASPEN+.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Nil

Other credits in programs

INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(5 credits)	Mandatory
INCH23	Troisième année du programme conduisant au grade d'ingénieur civil chimiste	(5 credits)	