

**Patraşcu Iulian, Design and control of energy-efficient processes for bioethanol and biobutanol dehydration, University Politehnica of Bucharest, 2020**

**Summary:** In the doctoral thesis are developed different energy-efficient processes for bioethanol and biobutanol dehydration, as well as the dynamic and control of the processes. The methodology involves the establishment of the thermodynamics, development of new design based on advanced separation techniques (dividing wall-column, vapor recompression), process optimization, heat integration, economic evaluation, and ensuring a control structure for the process dynamics.

The original contribution of the work are: (1) Literature study regarding the upstream and downstream processing of the bioethanol and biobutanol. (2) Development of a new separation design (based on conventional distillation columns) for biobutanol purification, which solves problems related to ethanol accumulation in the recycle streams, encountered in literature. (3) The study of the efficient biobutanol purification by using a hybrid design (liquid-liquid extraction – distillation). (4) Improvement of the conventional design for biobutanol purification by introducing advanced separation technology, with vapor recompression and azeotropic dividing wall-column. (5) The dynamics and process control of each bioethanol and biobutanol purification design is ensured, for which a control structure is provided.