

**Environmentally benign and catalytic processes, questions for oral exams
2019/2020**

1. Purification of industrial waste waters.
 - a. Physical- and physical-chemical methods
 - b. Biological methods
 - c. Thermal / oxidative methods
 - d. Complex methods
2. Comparison of the applicability of wet air oxidation and supercritical water oxidation for the purification of waste waters of the chemical industry.
3. Membrane processes. Balance equations, typical membrane modules. Classification of membrane processes based on driving force.
4. Comparison of membrane filtration processes regarding the operational parameters, types of membranes, operational mode and typical applications.
5. Supercritical fluid extraction, application, typical industrial examples.
6. Applications of supercritical carbon dioxide micronization (basic principles of RESS, GAS, PGSS techniques).
7. Properties of supercritical water, possible applications.
8. Main groups and characterization of alternative solvents.
9. Catalysis in water.
10. Catalytic reactions in non-solvent environment.
11. Industrial application of alcohols and ionic liquids.
12. Fundamentals of conversion of biomass waste into platform molecules.
13. Catalytic conversion of carbohydrates.
14. Catalytic hydrogenation of levulinic acid.
15. Comparison of homogeneous and heterogeneous catalysis (catalyst types, advantages and disadvantages).