



**University Kasdi Merbah Ouargla**  
**Faculty of Mathematics & Matter Sciences**  
**Department of Chemistry**

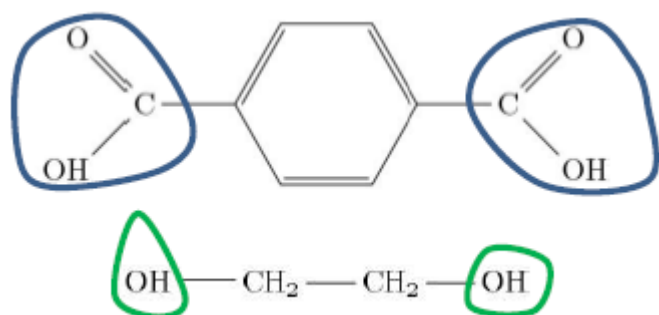


**Year:** 2023\2024 **Course:** Macromolecular chemistry **Level:** M2 applied chemistry

**TD N1: Polymer synthesis**

**Exercise 1:**

1) What are the important functions that appear on the two proposed molecules?



2-Write the equation for the reaction giving rise to the monomer. What is the nature of this reaction?

3- Deduce the equation of the reaction leading to the polymer.

4) A polyester has a molar mass of 249,600g, determine the degree of polymerization.

**Exercise2 :** We consider the reaction of adipic acid with 1,4-butanediol. We start from 801 g of diol. We obtain a maximum mass of water of 295.2 g. It is considered that water is eliminated as soon as it is formed.

1-Calculate the molar mass of the two monomers present.

2-Write the general reaction which describes this polycondensation by considering a stoichiometric ratio of functions. Specify the repeat unit of the macromolecular chain.

3-Justify whether this situation is verified in the case that arises. Otherwise, indicate which group(s) the chains are terminated at the end of the reaction and represent the general structure of the chain thus formed. Specify the value of the stoichiometric ratio.

4-Calculate the amount of adipic acid used. Deduce the stoichiometric ratio of functions.

5-Calculate the molar mass of the repeat unit and then the mass of polymer formed.

6- Calculate the number average degree of polymerization.