

CHEM-C3420, Basic of polymer technology

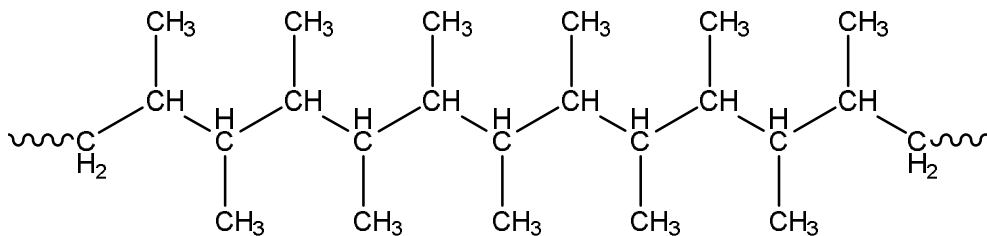
Course exam, 15.12.2021

9 questions, max 35points

1. (6p)

Below is described a part of a polymer chain

- What is the monomer used?
- Draw the structure in 'general form', i.e.  $-(A)_n-$
- What was the polymerization mechanism?
- Can the polymerization reaction be done in suspension process? Justify briefly



2. (5p)

You polymerized sebasinic acid and ethylene glycol in mass polymerization

In first polymerization You used 400 g of sebasinic acid and 120 g of ethylene glycol, while in second polymerization You used 202 g of sebasinic acid and 62 g of ethylene glycol.

In which polymerization the molar mass of the final product was likely higher? Justify Your answer

3. (2p)

Why there might be large variation in literature values for glass transition temperature for given polymer?

4. (3p)

During tensile testing the polymer sample breaks just after the yield point. What can You conclude about the morphology and glass transition temperature of the studied polymer material? Justify briefly.

5. (4p)

Normally, there are own polymer grades for injection molding.

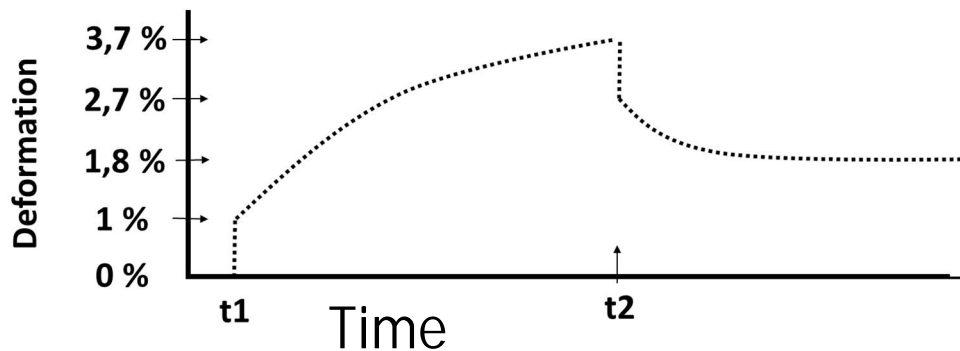
- How the polymer structure in these grades differentiate from the normal grades?
- What are the pros and cons when using these polymer grades suited for injection molding?

6. (6p)

Force X is fall on Your polymer sample at time point t1 and force X is removed at time point t2. The deformation of Your sample (as a function of time) is seen in figure below

- How large (in %) is the elastic deformation in Your sample?
- How large (in %) is the viscoelastic deformation in Your sample?
- The stress in Your sample at t1 is 30 MPA, what could be Your polymer material?

Justify briefly all your answers



7. (3p)

You are planning to prepare 50 pieces of closed plastic containers (volume 100 dm<sup>3</sup>) using HDPE. What is the processing method You would use? Justify briefly?

8. (4p)

Your task is to choose suitable material for luminous ceiling over Your patio. You should choose between PS and PC. How You justify (3-4 reasons) Your decision when You choose

- a) PS
- b) PC

9 (2p)

Name two reasons why PVC-trash is not suitable to be thrown in normal waste container.