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Courses » Principles of Polymer Synthesis

Announcements Course Ask a Question Progress Mentor

## Unit 5 - Week 4

### Course outline

How to access the portal

Week 1

Week 2

Week 3

Week 4

- Lecture 16: Principles of radical chain polymerization (Contd..)
- Lecture 17: Principles of Chain Copolymerization
- Lecture 18: Principles of Chain Copolymerization (Contd..)
- Lecture 19: Principles of Chain Copolymerization (Contd..)
- Lecture 20: Principles of Living Chain polymerization
- Quiz : Week 4 Assignment 4
- Week 4 : Lecture Material
- Week 4: Assignment 4 Solution

Week 5

Week 6

### Week 4 Assignment 4

The due date for submitting this assignment has passed. **Due on 2018-03-07, 23:59 IST.**

#### Submitted assignment

1) Which of the following is true for perfectly alternating copolymerization of two monomers? **1 point**  
( $r_1, r_2$ : reactivity ratio)

- (a)  $r_1 r_2 = 1$
- (b)  $r_1 = r_2 = 0$
- (c)  $r_1 > 1, r_2 > 1$
- (d)  $r_1 r_2 > 1$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(b)  $r_1 = r_2 = 0$*

2) Butyl acrylate (1) and methyl acrylate (2) undergo an ideal co-polymerization at 70 degree Celsius. What is the instantaneous composition of this copolymer for a monomer feed composition  $f_1 = 0.75$  and  $r_2 = 0.4$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(Type: Range) 0.88,0.89*

**1 point**

3) In a polymerization reaction of styrene using AIBN, what will be the effect on average degree of polymerization ( $X_n$ ), if reaction temperature increased by 10 degree Celsius **1 point**

- (a)  $X_n$  increases by 2-3 fold
- (b)  $X_n$  decreases
- (c)  $X_n$  remain constant
- (d)  $X_n$  increases by more than 10 fold

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(b)  $X_n$  decreases*

4) In a co-polymerization reaction of methyl methacrylate (1) and vinyl chloride (2);  $r_1 r_2 = 1$  and  $r_1 = 0.5$ , the instantaneous composition of the copolymer will consist of- ( $r_1, r_2$ : reactivity ratios) **1 point**

- (a) Same amount of methyl methacrylate and vinyl chloride
- (b) Greater amount of methyl methacrylate

Week 7

Week 8

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- (c) Greater amount of vinyl chloride  
 (d) Only homopolymers

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(c) Greater amount of vinyl chloride*

5) In a living radical chain polymerization employing reversible termination, which of the following is true for persistent radical? **1 point**

- (a) Highly reactive  
 (b) Initiates polymerization  
 (c) Very unstable  
 (d) Does not initiate polymerization

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(d) Does not initiate polymerization*

6) In an ATRP reaction,  $\text{CuBr(L)}$  [L= PMDETA] is used as- **1 point**

- (a) Initiator  
 (b) Catalyst  
 (c) Filler  
 (d) All the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(b) Catalyst*

7) Calculate the composite activation energy for the polymerization of styrene at 100 °C using di-tertiary-butyl peroxide as an initiator (Given:  $E_d = 33.5 \text{ kcal/mol}$ ;  $E_p = 7.0 \text{ kcal/mol}$   $E_t = 300 \text{ cal/mol}$ )

Hint

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(Type: Range) 23.5,23.7*

**1 point**

8) In a copolymerization of M1 (1) and M2 (2); if  $r_1 = r_2 = \infty$ , then **1 point**

- (a) Both the monomer will undergo simultaneous and independent homopolymerization  
 (b) Block copolymer will be formed  
 (c) Ideal co-polymer will be formed  
 (d) No reaction will occur

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*(a) Both the monomer will undergo simultaneous and independent homopolymerization*

9) Two monomers M1 and M2 having reactivity ratio  $r_1 = 0.2$  and  $r_2 = 0.5$  respectively, undergoes an azeotropic copolymerization, calculate  $f_1$  (monomer feed composition)

Hint

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

(Type: Range) 0.383,0.385

**1 point**

10) In a copolymerization reaction of monomer M1 and M2, if  $k_{11}k_{22} = k_{12}k_{21}$  then what is the type of copolymerization? **1 point**

- a) Ideal Copolymerization
- b) Alternative copolymerization
- c) Block copolymerization
- d) Can not comment

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

a) Ideal Copolymerization

Previous Page

End

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