

Chem514 Copolymers and Polymer Blends
Spring 2014-2015
Homework 1
Due April 9, 2014
Instructor: Prof.Dr. Elvan YILMAZ

Answer the following questions based on the article

Lalloz, L. et al., "Copolymerization Study of 4-Vinylpyridine with N-Dodecylacrylamide", Eur.Polym.J, 33(7) pp 1099-1103, 1997.

- 1) Given the comonomer feed and copolymer composition values in the article, calculate the monomer reactivity ratios for 4VP and C₁₂AM using
 - a. Finemann-Ross
 - b. Kelen-Tüdös
 - c. Mayo-Lewismethods. Show all your work.

- 2)
 - a. Plot the instantaneous copolymer composition F_{4VP} as a function of the comonomer feed composition f_{4VP} . Compare the calculated curve with the experimental (average copolymer composition) results. Give an explanation for the well agreement between theory and experiment.
 - b. What type of copolymerization behaviour is observed with the 4VP/ C₁₂AM system.

- 3) Calculate the 4VP centered triad fractions for $F_{4VP} = 0.274, 0.5$ and 0.94 . Give an explanation for the distribution obtained.

- 4)
 - a. Describe how copolymer composition and the triad fractions have been obtained by C-13 NMR spectroscopy.
 - b. Suggest two other methods to determine 4VP content or C₁₂AM content of the copolymers using proper references.