Ethyl Acetate Kinetics

TO: Engineering Development Branch
FROM: Engineering Division
SUBJECT: Ethyl Acetate Kinetics

A design study for the new reactor for the ethyl-acetate/sodium hydroxide needs the kinetic parameters (rate constant, reaction order, activation energy) for the reaction.

\[ \text{CH}_3\text{CO}_2\text{C}_2\text{H}_5 + \text{NaOH} \rightarrow \text{CH}_3\text{CO}_2\text{Na} + \text{CH}_3\text{CH}_2\text{OH} \]

Using the laboratory equipment, determine if the existing stirred-tank reactor (volume = 80 cubic meters) is large enough for to process the stream described below. Please determine the temperature at which this tank can achieve 96% conversion assuming the following feed conditions:

- Et Ac feed-stream flowrate = 5300 moles Et Ac per day
- Et Ac feed-stream concentration = 0.023 molar Et Ac
- NaOH feed-stream flowrate = 7950 moles NaOH per day
- NaOH feed-stream concentration = 0.046 M NaOH

Useful Reference: