Determining Reaction Order and Rate Constant through Experimental Data Analysis

Karan Shukla
2022UCH0052
Department of Chemical Engineering
Indian Institute of Technology (IIT) Jammu

Assignment-2

Problem Statement

This study focuses on determining the kinetics of the dimerization reaction of pure gaseous reactant A, represented by the stoichiometric equation.The initial concentration of reactant A is C_{A0}=100 millimol/L, and the reactor volume is V= 0.1 liters. The objective is to analyze the relationship between the gas feed rate and the conversion of reactant A in a mixed flow reactor. The experimental data for various gas feed rates are collected, providing the final concentration of A at different flow rates. The following data has been obtained:

Run Number	v_o (L/hr)	CAf (mmol/L)
1	10	85.7
2	3	66.7
3	1.2	50
4	0.5	33.4

Soultion Link:

Google Colab:

https://colab.research.google.com/drive/1YFFfD9NA12BMsWDbAYLd0Iglg-nlvrQW?usp=sharing

Or

GitHub:

https://github.com/karan-1310/Chemical-Reaction-Engineering/blob/main/Reaction_Rate_for_Ideal_Reactors_Batch%2CCSTR_%26_PFR_.ipynb