SERIES-OXIDATION OF ETHANOLTO ACETALDEHYDE PETROCHEMICAL IN TUBULAR REACTOR

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ABSTRACT

The model for the series-oxidation of ethanol feed into acetaldehyde aprecursor petrochemicalproductis presented in these studies. A unimolecular feed C_2H_5OH stoichiometric balance equation $A \rightarrow B \rightarrow C$ at steady state process was fundamentally investigated with its kinetic principles of batch reactor.The results from the kinetic studies were applied to establish the appropriate rate law. The trajectories of the control parameters show progressive optimum performance of the reactor. Finally, research showed three conceptual ways to scaling-up a tubular reactor throughput **S**into a full scale industrial process which suffices, adding identical reactors in parallel,making the tube longer and increasing the tube diameter.The scaling-up on the throughput wasfundamentally based on$\boldsymbol{S} = S_{Tubes}S_R^2\frac{[P_{in}^3 - P_o^3]_2\beta_1}{[P_{in}^3 - P_o^3]_1\beta_2}$. The scaling-up model is design for both series and parallel tubes with a corresponding cost elements of$40,000, dollars (N14, 232, 498.00).

Keywords: Model, stoichiometric-equations, rate law, series-oxidation-ethanol, Acetaldehyde, cost-estimates, scaling-up.