Organicc Chemistry: 2018 Development of an optimal control scheme for the process of epoxy resins modification with a complicated mathematical model in the control loop- Sharikov IV

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Distributed state variables and significant dead time are discussed with a highly exothermic technological process for optimal control of the problem. The control loop is considered in the model using a flexible control system. It is shown that the heat flux calorimetry is an adaptive multistage kinetic model based on a process model for effective experimental technique. It can also be applied to multiphase reaction systems with simplified hydrodynamic models for the description of mass transfer phenomena. Has the mathematical process model and its associated control system been demonstrated to be an important industrial process? Modification of epoxy resins with 1, Improved physico-chemical and mechanical properties of epoxy-urethane polymers with further synthesis for 4-butanediol. The mathematical process model makes it possible to specify the optimal operating mode for each resin and implement the optimal control.

The need to create complex models of industrial processes with high predictive capacity for various purposes which can be used in a number of situations. These models have an increasing tendency to penetrate personalized control interfaces and sometimes make it possible to provide advice on an underlying technology without any complex information.

Modeling with a high-fidelity prediction can provide a new significant value, and to achieve this value, it is necessary to model the effort of an effort as well as carry out experimental studies of the required quantity. One of the remaining challenges is the modeling and its surroundings of the industry and the technical personnel involved in the management of the process and the potential future benefits of broadening their perceptions.

An adequate model can sometimes be applied to a larger design area than a conventional experimentation or construction of pilot plants, and this can be done in a much shorter time. Therefore, the model-based engineering approach can generate important new information that is simply not available through other techniques. The case of a new technology and a trial period in which the pilot plant can be reduced is remarkable in this case. This is especially important when we are dealing with flexible or multi-assorted technology.

In the case of an object with distributed parameters, it is necessary to use a predictive control system which provides the potential to generate control actions through a set of compensation measures. The generation of such control signals is based on the analysis of object input variables and output variables into an exact algorithm. In this case, it is possible to use the calculation methods which take into account the transfer function of a transfer channel through a disturbance. In these cases, a control system can generate the necessary control actions that need to be regulated at a given level. If we use a control loop in a computer, it is possible to use a mathematical model to predict the behavior of the object. input disturbances. In this case, the control system can be called the “control system with a fast model”. Thanks to this solution, a mathematical model of the object makes it possible to obtain an objective response faster than the real object, and it is possible to analyze it and generate an optimal control action to compensate for any possible deviation. The set points from regulated variables.

Process systems are often described in terms of a mixed set of integral, partial differential and algebraic equations (IPDAE), and this is the most commonly used set of software tools in the general presentation. IPDAE systems are typically reduced to a mixed set of ordinary differential and algebraic equations, or DAEs. Ordinary differential equations (ODE) are generally the result of conservation of fundamental quantities of nature, and algebraic equations (AE) result from processes of certain auxiliary relationships.

Thermodynamic, transport, and flow transitions of the guiding phenomena in discontinuities as well as structural changes in the structure of the structure. Some of these transitions are reversible symmetrical or asymmetrical discontinuities, others are irreversible discontinuities. Another type of discontinuity results from the imposed external actions imposed by the system at a given time, often by discrete manipulations and disturbances such as the operating procedure or the failures.

The proposed approach with 1,4-butanediol alcohol with modifying epoxy resins has been investigated and verified. Modification is the ultimate polymers or polymer coatings of a wide range of physical and mechanical properties for a powerful instrument. The kinetic study of chlorine containing epoxy resins of modification reactions using heat flow calorimetry. The Calvet C80 calorimeter (SETARAM Instrumentation) was applied. The heat generation speed curves were taken from the data with the experimental results taken at the end points. The following kinetic scheme has been proposed for the modification process

For an optimal temperature profile, the selected chemical reactor must provide a maximum concentration of the final product (modified epoxy groups) at the end of the process. The heat exchanger systems (cooling water and heating steam temperatures) were selected as control measures.

Analysis of the problem of controlling the problem of heat production / consumption with a complex technological process. Heat flow and kinetic modeling of an experimental technique has been proposed to develop a detailed technological process with great predictive capacity. The technological process of modifying epoxy resins has been discussed for optimal process conditions. Experimental study and modeling by developing a detailed mathematical model of account based disturbances - the basis for this optimal control task