Analysis of Fluid Flow in Transfer Line Exchanger of Steam Cracking Furnace

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Abstract
The purpose of this research is numerical study of fluid flow and temperature distribution in the transfer line exchanger (TLE) of thermal cracking furnace. That is used for cool out flow of thermal cracking reactors. The advantages of using these exchangers in industries are the low cost of separation, production of high pressure steam and high heat recovery from the cracked gas. Numerical solution of heat transfer and fluid flow can be done when governing laws on these processes have been explained by differential equations. Complex flow can be modeled by numerical methods of computational fluid dynamics (CFD), such as finite volume, without using additional approximations. The advantages of using computational fluid dynamics include diagnosis of flow, rapid evaluation of novel process route, energy efficiency and low cost design. For simulation of fluid flow and heat transfer in the heat exchanger, FLUENT software and k–ε model for turbulent model are used. By investigation of turbulent models, it is observed that application of turbulent models with orders higher than 2 are not proper for modeling of heat exchangers. Simulation results were presented for temperature, pressure and velocity contours, which results show good agreement in comparison with experimental data.

Keywords: Transfer Line Exchanger, Thermal Cracking, Computational Fluid Dynamics

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Experimental & Theoretical Investigation of Pressure Drop at HPHE[1] in Air Condition Systems

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Abstract
In order to energy saving in air condition systems, using of HPHE is the style that chose in these experimental. Hphe used for precooling and preheating. Hphe is an extra heat conductor that acts with few temperature gradients between evaporator and condenser. Hphe act with any heat pump. Using of hphe in air condition systems, saves 10-15% energy in evaporator of hphe as precooling and 40-60% in condenser of hphe as preheating.
Correct work of HPHE correlate to various parameters, similar pressure drop. In this paper, we build an hphe and compare pressure drop at theoretical manner with experimental in air condition system.

Keywords: Air Condition, HPHE, Saving of Energy, Pressure Drop

1. Heat Pipe Heat Exchanger

Purification and Decolorization of Extracted Glycyrrhizin from Licorice Root for Pharmaceutical Applications

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Abstract
Licorice is a self-propelling plant that has many applications in pharmaceutical and food industries. Glycyrrhiza Glabra is a kind of licorice whose main active component is a triterpenoid saponin named glycyrrhizin. After extraction, acid precipitation used for preliminary isolation and concentration. Flavonoids are found as pigment in the aqueous extracted product. Decolorization of this extract is one of the major problem. Adsorption with activated carbon was used considering operational parameters including pH, temperature and agitation. Finally, decolorized extract was purified by crystallization in aqueous ethanol at different pH and ethanol percentage to yield the final purified product. Results show that the best pH for precipitation is about 2. Norit Activated Carbon is found to be the good choice for adsorption by 64% yield and 68% purity in industry. Crystallization can purify the extract by 90% aqueous ethanol at pH 13 to result in a product of 98.2% purity. In this case, however, the production output decreased to 65%.

Keywords: Licorice, Glycyrrhizin, Purification, Decolorization, Pharmaceutical Application

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Ultrasonically Initiated Polymerization

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Abstract
Ultrasound consists of high-frequency sound waves and is widely used in medical purposes and chemical reactions, especially polymerization. The emulsion polymerization of some monomers can occur without the conventional free radical initiators under ultrasonic irradiation. In this paper recent experimental results are reviewed in three sections: (1) nature and source of the free radical for the initiation process; (2) effects of different types of cavitation; and (3) dependence of the polymerization rate and the polymer molecular weight on acoustic intensity, inert gas flow rate, type of surfactant and its concentration, and initial monomer concentration. Since the polymerization of monomer and degradation of polymer occur simultaneously, the ultrasonically initiated emulsion polymerization is complicated. The experimental results show that ionic surfactants play a very important role in obtaining a high polymer yield, and high conversions can be reached in a short time with usage of a high purge rate of N2. An increase in ultrasound intensity leads to an increase in polymerization rate in the range of cavitation threshold and cavitation peak values. Lower monomer concentration favors enhancement of polymerization rate.

Keywords: Ultrasound, Polymerization, Initiator, Emulsifier, Cavitation

Synthesis of Gold Nanoparticles by L-Alanine and their Stability with Chitosan

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Abstract
Gold N
N -Medicine .Therefore ,it is important to find out /use suitable techniques to synthesize and prepare nanoparticles with different and suitable size, shape and distribution for various applications. In this article, preparation of gold nanoparticles by chemical reduction method and application of L-Alanine as a reducing has been discussed. In this study, $HAuCl_4 .3H_2O$ was used as pre-material (pre-cursor) and Chitosan were used as natural surfactant to stabilize the synthesized particles. The size distribution and formation of gold N
electron microscopy and UV spectroscopy indicating the diameter of gold nanoparticles at the range of 15-40 nm with fine distribution. The formed nanoparticles and stabilized with chitosan analyzed by UV-Vis spectroscopy that showed the highest absorption at 544 nm, and were stable for 20 days

Keywords: Gold nanoparticles, Chemical reduction, L-Alanine, Chitosan

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Modeling and Determining of Mass Transfer Coefficients During Osmotic Dehydration of Carrot

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Abstract
Osmotic dehydration process has an important role in food and pharmacy industry, to gain better quality and properties. This paper tries to study this subject for carrot roots. Because the structure of roots is different in radial and longitudinal direction, determination of diffusion coefficients are carried out in both directions using experimental data. Mathematical modeling is also done using the solution of Fick's I. and II. laws. Experimental results show the effect of concentration on diffusivity in both radial and longitudinal directions.

Keywords: Sugar, Carrot, Osmotic Dehydration, Mathematical Modeling, Radial and Longitudinal Mass Coefficients

Survey of Dynamic Behavior and Control of Particulate Process Systems

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Abstract

Particulate systems are one of the common systems in chemical industries and a subset of Quasi Rational Distributed Systems (QRDS). Near 60 percent of chemical industries are related to Particulate systems. The main goal in this kind of systems is production of desire classified particles in size distribution. This matter causes control problems for these kinds of systems for achieving to desired seed distribution be one of the biggest problems in the field of process control. The most important problem is recognition of behavior of these systems and proposing a proper way in control field of particulate process. Dynamic properties, very complex governing equations, nonlinear dynamic behavior and lack of perfect control by common control methods needs wide research in control and recognition of structure of these processes.

In this research is tried to survey of presented methods in field of particulate system process dynamic and their solving methods and comparing the results, new ways are offered in control of these systems.

Keywords: Particulate Process, Quasi Rational Distributed Systems (QRDS), Nonlinear Control