MINSK INTERNATIONAL HEAT AND MASS TRANSFER FORUM

ABSTRACTS

УДК 536.24

Howak W., Stachel A, EFFEKT OF PRESSURE OH HEAT EXCHANGE AT A FORCED FLOW IN AMHUIAR CHANNEL // Тепломассообмен-ММФ-92. Конвективный тепломассообмен. Т.I, ч. I. - Минск: АНК "ИТМО им. а.Б. Лыкова" анб, 1992, - С. 3 - 9.

In the Thernal Engineering Division of the Technical University of Szczecin research has been carried oat for yesr3 on saturated diving. As part of this research, the problem of heat exchange during forced flow under hyperbaric conditions has been taken up. Research work concentrated on heat exchange during forced air flow through a duct of toroidal cross-section. Research included the flow of the medium within the laminar flow and transient flow. From the analysis of the phenomenon, it can be seen that the process of heat exchange changes and intensifies with growing pressure.

Figs.4. Bibl.3.

УДК 536.24

Kasz J.A. RECIRCULATING MIX-CONVECTIVE PLOWS IN TUBES // Тепломассообмен-ММФ-92. Конвективный тепломассообмен. Т.I, ч.1. - Минск: АНК «ИТМ0 им. А.В. Лыкова» АНБ, 1992. - С. 22 - 30.

Numerical solution is presented for developing laminar mixed convection with, flow reversal and recirculation in a vertical tube basing on the full Navier - Stokes equations. A comparison is made with the previous parabolic studies. The differences of both ap-proaches are pointed out and discussed. For an upward directed flow in an isothermal tube the plots of stream function, vorticity velocity components and temperature are presented. Flow reversals and recirculation are predicted. In addition to flow analysis the influence of free convection on the mean Nusselt numbers is presented.

Figs.7. Bibl.6.

УДК 536.24

Kozak T. EFFECT OF GAS PRESSURE ON FREE CONVECTION ROUND A HORIZONTAL WIRE AT SMALL THE RAYLEIGH NUMBERS // Тепломассообмен-ММФ-92. Конвективный тепломассообмен. Т.I, чI. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 70 - 76.

In the paper the results of free convection round a horizontal wire at rised pressure are presented.

The tests were carried out in a testing stand with the horizontally situated gauging probe made of copper wire and nickel wire.

Gauging probes were placed in a pressure chamber filled with are, helium and helium-air mixes. The tests were performed withing the rande of pressure variation from 0,1 to 5 MPa.

The results are presented as dimensionless equations and grapihically.

Figs.5. Bibi.I4.

УДК 536.24

Korbi A., Cybulski A. 2D TRAVELLING WAVE ASSOCIATED WITH THE RMAL CONVECTION INDUCED IN FLUID BY LASER LIMITED SURFACE HEATING // Тепломассообмен-ММФ-92. Конвективный тепломассообмен. Т.I . Ч.2.- Минск: АНК "ИТМО им. А.В. Лыкова" АНБ , 1992. - С. 3-6.

A sudden contact of a continuous laser beam of weak power (20w), with air-oil interface, induces a convective oil flow layer which increases in mass and volume. A travelling front, separating the convective heated oil part of its remaining, not moving cold mass, was observed by use of the Mach-Zender interference method. A qualitative description revealed that the travelling front is a singular surface through whose same physical properties are discontinuous. However, the heat flux and the mass flow across the front itself are continuous.

Figs.4. Bibl.3.

УДК 536.24

Jonas P. EFFECT OF A HEATED-FILAMFNT ARRAY ON THE FLOW STRUCTURE // Тепломассообмен-ММФ-92. Конвективный тепломассообмен. Т.I, ч. 2. - Минск: АНК "ИТМО им. А.В. Лыкова " АНБ, 1992. - С.30-34.

A method *of* the artificial generation of turbulent fluctuations of velocity (by means of a screen) and of temperature (by means of heated filaments Is described. From the measurement of intensities and correlation coefficient of velocity - and temperature - fluctuations it follows that the decay rates of velocity fluctuations are very similar regardless of the method of their generation, however the decay of the simultaneously generated fluctuations of velocity and temperature are different.

Tab. 1. Figs. 2. Bibl. *7.*

УДК 536.24

Genedese A., Franceschi M.A., Quersoli G. A LABORATORY SIMULATION OF DISPERSION PHENOMENA IN THE ATMOSPHERIC CONVECTIVE BOUNDARY LAYER // Тепломассообмен-ММФ-92. Конвективный тепломассообмен. Т.I. ч.2. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 42-51.

The dispersion of passive pollutant released within the Mixed Layer (ML) is investigated by means of a laboratory model The Mixed Layer is the region of the Atmospheric Boundary Layer where strong mixing occurs due to the buoyancy driven turbulence associated with the heat transfer from the surface. It is usually limited from above by a stable layer (called Capping Inversion), that acts as an interface with the Free Atmosphere. The ML grows, since die sunrise, through a one way entrainment process: less turbulent air of capping inversion is entrained into more turbulent air, 1ml it never become shallower by entrainment. As a consequence, the pollutants released near the ground are trapped within the ML. These atmospheric conditions may be considered critical for the pollutant concentration.

Pigs. 21. Bitl. 7.

УДК 536.3/33

Mann D., Viskanta R. MEASUREMENT AND PREDICTION OP THE TRANSIENT TEMPERATURES IN GLASS PLATES // Тепломассообмен-ММФ-92. Радиационный и комбинированный теплообмен. Т. 2. – МИНСК: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 12-21.

Experimental measurements of the transient internal temperature distributions in 2.26, 3.71 and 6.76 mm thick glass plates using thermocouples fused in the glass and by the spectra remote sensing (SRS) method have been carried out. Experimentally measured and reconatructed temperatures are compared to predictions based on the solution of the transient energy equation where the internal radiative transfer has been accounted for using rigorous radiative transfer theory. A discussion of the experimental method to determine the temperatures, and the validation of the energy model and of the SRS method is included. The measurements were made аз the test plates cooled, from an initial temperature of approximately 520^0 C, by radiation and natural convection in the laboratory ambient. Temperatures determined by the SRS method are compared with those from thermocouples fused in the glass and with theoretical predictions to demonstrate the accuracy and limitations of the SRS method. The agreement between the SRS method, therm .couple measurements, and theoretical predictions show that the SRS method can be used to determine the front, center and back temperatures to within approximately ±0.5%, ±1.0% and ±5.0%, respectively, for a 3.71 mm thick glass plate when intensity of radiation emerging from the plate is measured from one side.

Fig. 6. Bibl. 11.

УДК 536.3:535.312/34

Benko I. HICH EMISSIVITY COATING FOR ENERGY CONSERVATION IN FURNACES *II* Тепломассообмен-ММФ-92. Радиационный и комбинированный теплообмен. Т. 2. – Минск: АПК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 35-42.

The article describes a new method which increases radiation heat transfer of furnace refractory linings. The method, which is the application of a high emissivity coating, results partly in energy savings, partly increases gas tightness and life span of the lining. As heating time is decreased, the method also makes the operation of the furnace more flexible.

Application ENECOAT furnace coating increases the emissivity of ceramic fibre insulations by 45 U, while that of shamotte by 20 4. The phenomenon is illustrated by infrared thermograms. Industrial applications are also referred to.

Fig 4. Bibl. 9.

УДК 536.33:535.34

Kim Sun Ho. DERIVATIOM OF A FORMULA OF RADIATION HEAT TRANSFER AND ITS APPLICATION TO CALCULATION OF A SOLDERING PROCESS IN VACUUM // Тепломассообмен-ММФ-92. Радиационный и комбинированный теплообмен. Т. 2. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 64-68.

Basic premises for the calculation of the radiation heat transfer In a transparent medium are given and on the basis of the hypothesis a new formula of the radiation heat transfer between bodies of arbitrary forms is derived. By the formula accurate values of the radiation coefficient are calculated and the vacuum soldering process of a heat exchanger is also analysed.

Formulas of radiation heat transfer which is widely used In practice are we 11 known (1), (2). However. it is not easy to calculate the resultant radiation density on a arbitrary point of a body surface by the formulas, because integral equations for the real radiation energy on the point should be solved [3], [4].

In this paper is derived a new formula for the calculation of a radiation heat transfer between two bodies located arbitrarily in a transparent medium in the case of closed system on the basis of generalized premises of radiation heat transfer.

An analysis of a radiation heat transfer in the vacuum soldering process for manufacturing a heat exchanger Is also presented [5].

Bibl. 5.

УДК 661.61

Saljnikov A., Repic B. CHEMICAL REACTIONS KINETICS PARAMETERS OF PULVERIZED COAL COMBUSTION // Тепломассообмен-ММФ-92. Тепломассообмен в химически реагирующих системах. Т. 3. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 184-187.

The points of intersection of the interpolated straight lines with the ordinate are the numerical values of the pre-exponential term (k_0). The activation energy (E) for each coal type is

obtained by multiplying the slope of each line with the universal gas constant (R). The example of obtained numerical values are given in the Table.

Tab. 1. Bibl. 1|

УДК 536.24

Padki M.M., Liu H.T., Kakac S. EXPERIMENTAL AND NUMERICAL STUDY OF TWO-PHASE FLOW OF INSTABILITIES IN A VERTICAL FOILING CHANNEL SYSTEM // Тепломассообмен-ММФ-92. Тепломассообмен в двух разных системах. Т. 4, ч. I. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 3 - 7.

Приведены результаты экспериментального и численного исследования нестабильности двухфазного потока при кипении в вертикальной системе каналов. Получено удовлетворительное согласование по температурным пульсациям.

Ил. 3.

УДК 536.24

Quazia B., Narvillet C., Feidt M. TWO PHASE LOCAL HEAT TFAHSFER MEASUREMENTS IN AND DOWNSTEAM FROM A U-BEND // Тепломассообмен-ММФ-92. Тепломассообмен в двухфазных системах. Т. 4, ч. I. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С 92-106.

Many heat exchangers and shell-and-tube exchangers are constructed of tubes having U-bends. The existence of these bends is usually Ignored in heat-transfer calculations, but they have sometimes a considerable influence on the performance • of the exchanger, and the increasing precision of design justifies a study of their effects, during upflow forced convective evaporation.

The effect of 180 degree bend on heat transfer to a two-phase up flow was studied. Experiments were made with refrigerant 22 and the study covered the following parametric ranges : total mass velocities 120 to 420 Kg/m*s, vapor qualities 20 to 90 7., average heat fluxes S to 30 kW/m^2. Heat transfer coefficients obtained from data show a strong variation with axial and radial position. Correlations for heat transfer coefficients in and downstream the bend were proposed.

Tabl. 2. rigs. 8. Bibl. 7.

УДК 621.765.05/645

Saidani H., Day B., Evans K.O. COMPUTERISED APPARATUS FOR THE EXPERIMENTAL STUDY OF HEAT AND MASS TRANSFER IN POROUS BODIES // Тепломассообмен-ММФ-92. Тепломассообмен в дисперсных системах. Т. 5. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 75-83.

A description is presented of a computer based apparatus capable of imposing and controlling different patterns of relative humidity variations (such as step changes, and sinusoidal variations) across samples of building material. The apparatus also controls and monitors other

variables of significance to moisture flow studies, particularly temperature, total pressure and moisture flow. To show the capabilities of the apparatus, results from tests on a 6 mm plaster sample are presented, together with details of the control program.

Fig. 9. Bibl. 10

УДК 66.096.5

Mrani I,, Fras G. , Benet J.C. EFFECT OF IK FDFMATIQN OM MASS AND HEAT TRANSFER IN A HETEROGENEOUS BIPHASE MEDIUM // Тепломассообмен-ММФ-92. Тепломассообмен в дисперсных системах. Т. 5. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 100-109.

The objective of the present study was to model mass and heat transfers in heterogeneous biphase medium taking into account the simultaneous effects of mechanical, thermal and liygrometic actions. The analysis is based on the thermodynamics of irreversible processes applied to an open system, with an assumed elastic behaviour of the skeleton. I lie model was designed, for example, to describe the internal processes of mass transter which deformable medium during drying operations.

Bibl. 5.

УДК 536.244

Несенчук А.П.. Бокун И.Л., Седнин В.А. ТЕПЛО- И МАССОПЕРЕНОС В АППАРАТАХ РАЗДЕЛЕНИЯ ГАЗОВЫХ СРЕД С ПСЕВДООЖИЖЕННЫМ СЛОЕМ СОРБЕНТА // Тепломассообмен-ММФ-92. Тепломассообмен в дисперсных системах. Т. 5. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 110-113.

Приведена математическая модель для тепло- и массопереноса в термопсевдоожиженном слое промышленного десорбера. Псевдоожиженный сорбент с эффективными свойствами омывает трубки вертикального пучка. Результаты расчета согласуются с экспериментальными данными, полученными на опытно-промышленной установке.

Библ. 3 назв.

УДК 66.023.001.24

Броунштейн В.В. ТЕПЛОМАССООБМЕН ПОЛИДИСПЕРСНЫХ ТВЕРДЫХ ЧАСТИЦ С ЖИДКОСТЬЮ ПРИ СТЕСНЕННОМ ОСАЖДЕНИИ В ПОЛОЙ КОЛОННЕ // Тепломассообмен-ММФ-92. Тепломассообмен в дисперсных системах. Т. 5. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 114-117.

Получена система уравнений, описывающих процессы тепломассобмена жидкости с полидисперсными частицами, оседающими в полой колонне. Система учитывает влияние концентрации частиц на коэффициенты тепломассообмена и скорость стесненного осаждения. Влияние стенок аппарата сказывается на коэффициенте "макродиффузии", величина которого пропорциональна диаметру аппарата. Разработан колонный аппарат

для прямоточно-противоточного растворения полидисперсных частиц. Получено распределение концентраций и температур по высоте колонны. На примере частиц сильвинита показана возможность режимов, близких к "идеальному вытеснению", для массообменных процессов и невозможность таковых для теплообмена.

Ил. I. Библ. 5 назв.

УДК 532.574

Irvine T.F. ,Kim S., Yamasaki T. HYDRODYNAMIC ENTRANCE LENGTHS AND ENTRANCE CORFECTION FACTORS FOR POWER LAW FLUIDS IN A CIRCULAR DUCT // Тепломассообмен-ММФ-92. Тепломассообмен в реологических системах. Т. 6. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992.-С. 21-31.

Calculations and measurements are reported for the hydrodynamic entrance lengths for a power-law fluid in a circular duct. It has been determined that the entrance correction factor which accounts for the excess pressure drop in the entrance region Is strongly dependent on the rheological properties of the fluid. Good agreement was found between the predictions and the experimental results.

Tab .it. Fig. **5.** Bibl. 21.

УДК532.135:536.24

Malafeew E., Vick B., Liang C., Rogers Craig A**.** a distributed electro-thermo-mEchanical analysis of shape memory alloy actuators // Тепломассообмен-ММФ- 92.Тепломассообмен в реологических системах. Т.6.- Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. – *С.* 81 - 95.

This paper describes a method of analyzing SMA actuators considering distributed heat transfer in addition to constitutive and mechanical effects. Basic SMA properties, the actuator model, the numerical solution, and a case study between distributed and lumped analysis of the same actuator are included.

Tab.l. Fig. 11. Bibl. 5.

УДК 621.376.525:532.57

Liepsch D.W. TWO PHASE FLOW STUDIES IN A T –JUNCTION USING LASER-DOPPLER-ANEMOMETER //Тепломассообмен-ММФ - 92. Тепломассообмен в реологических системах. Т. 6. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 129-138.

Fluid dynamics factors- such as steady-unsteady flow, elasticity of the wall, non-Newtonian behavior of blood at low shear rates-may be responsible for atherosclerosis, deposits of platelet, red cells, lipids at arterial bends and bifurcations. At bends and bifurcation of human

arteries such deposits and blockages are often found especially in regions where die flow forms separation regions, vortex formation and secondary flow is created. Blood is a two phase system consisting of plasma and blood cells. It is therefore necessary to study the microscopic, time dependent velocity field in such disturbed flow areas. Fundamental two phase flow studies in a 90°-T-junction of a glass model and an elastic model using a laser-Doppler-anemometer will be presented. Velocity measurements with LDA on human blood are normally only possible in vessels or models of diameters less than 0.5 mm. Otherwise the laser light is absorbed by the red cells. Therefore a bloodlikc fluid was used to mimic the blood flow. Rheological and flow measurements were done using either elastic artificial particles with a biconcave disc-shape or red blood cells ghosts to simulate red blood cells.

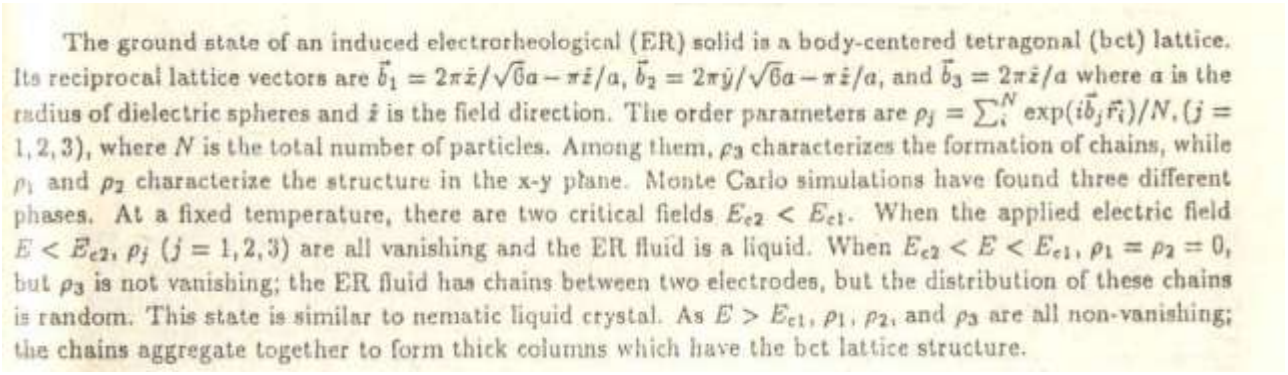
The flow behavior was visualized using dyes and a birefringent solution. Having localized the disturbed flow regions, LDA measurements were carried out. Velocity profiles different from those found in Newtonian fluids were found. LDA measurements were possible up to concentrations of 40% particles using red blood cell ghosts.

It was also shown that the non-Newtonian flow behavior and the elasticity of the vessel wall has a great influence on the velocity flow field in regions where the flow is separated from the wall.

Fie. 5. Bibl. 18.

УДК 532.135:536.2

tao r. phase transitions and order parameters in electrorheological fluids// Тепломассообмен - ММ5-92. Тепломассообмен в реологических системах. Т. 6. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 144-150.



The ground state of an induced electrorheological (ER) solid is a body-centered tetragonal (bct) lattice. Its reciprocal lattice vectors are $\vec{b}_1 = 2\pi\hat{x}/\sqrt{6}a - \pi\hat{z}/a$, $\vec{b}_2 = 2\pi\hat{y}/\sqrt{6}a - \pi\hat{z}/a$, and $\vec{b}_3 = 2\pi\hat{z}/a$ where a is the radius of dielectric spheres and $\hat{z}$ is the field direction. The order parameters are $\rho_j = \sum_i^N \exp(i\vec{b}_j\vec{r}_i)/N, (j = 1,2,3)$, where N is the total number of particles. Among them, ρ_3 characterizes the formation of chains, while ρ_1 and ρ_2 characterize the structure in the x-y plane. Monte Carlo simulations have found three different phases. At a fixed temperature, there are two critical fields $E_{c2} < E_{c1}$. When the applied electric field $E < E_{c2}$, ρ_j $(j = 1,2,3)$ are all vanishing and the ER fluid is a liquid. When $E_{c2} < E < E_{c1}$, $\rho_1 = \rho_2 = 0$, but ρ_3 is not vanishing; the ER fluid has chains between two electrodes, but the distribution of these chains is random. This state is similar to nematic liquid crystal. As $E > E_{c1}$, ρ_1, ρ_2, and ρ_3 are all non-vanishing; the chains aggregate together to form thick columns which have the bct lattice structure.

Fig. 2. Bibl. 13.

УДК 532.135:536.2

Whittle M., Fi.roozian R. , Peel D..J., Bullough W.A.. GENERALISED PRESSURE RESPONSES OF ELECTRO-PHEOLOGICAL VALVES **in** THE STEADY STATE, TTME AND FREQUENCY domains //Тепломассообмен - ММФ-92. Тепломассообмен в реологических системах. Т. 6. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 151 - 160.

Experimental data from tests on an ER valve pertinent to the development of s controller for high speed machine duty has been analysed to show that three common, underlying modes of

response arc present. This is demonstrated for a range of industrial Dow velocities and electrode dimensions, in the time and frequency domains. The dependence of steady-state pressure on the electric field is also discussed.

Tab. 5. Fig. 6. Bibl. 6.

УДК 539.219.3

Galka A., Telega J. J., Wojnar R. HOMOGENIZATION, THERMODIFFUSION AND THE CHANGE IN THE INITIAL TEMPERATURE // Тепломассообмен – ММФ - 92. Тепломассообмен в реологических системах. Т. 6. – Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, с. 228-234.

Effective material constants are derived for a periodically nonhomogeneous, linear, thermoelastic solid In which diffusion takes place. To derive the homogenized quantities the method of two-scale asymptotic expansions is used. The change in the initial temperature for the homogenized solid is discussed.

Bibl. 5.

УДК536.24

Taler J. NUMERICAL SOLUTION OF THE NONLINEAR STEADY-STATS INVERSE HEAT CONDUCTION PROBLEM // Тепломассообмен-ШФ-92. Вычислительны;: эксперимент в задачах тепломассообмена и теплопередачи. Т.9, ч.1. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С.171-180.

An efficient and accurate numerical approach is developed for solving steady-state nonlinear inverse heat conduction problems involving the determination of the space-variable boundary conditions from discrete internal temperature measurements. The unknown parameters associated with the solution are selected to achieve the closest agreement in a least squares sense between the computed and measured temperatures using the Gauss-Newton method in conjunction with the singular value decomposition or modified Gram-Schmidt methods. The proposed procedure also works very well when the inverse heat conduction problem is ill-conditioned.

Tabl.I. Figs.2. Bibl.7.

УДК 66.096.5

Andersson B.A., Leckner B. BED-TO-WALL HEAT TRANSFER IN CIRCULATING FLUIDIZED BED BOILEFS // Тепломасообмен-ММФ-92. Вычислительный эксперимент в задачах тепломассообмена и теплопередачи. Т. 10, - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. – С. 3-12.

The fluid dynamic mechanisms governing bed-to-wall heat transfer in circulating fluidized bed boilers (CFBB) are not well understood. In addition, the limited information obtained in small laboratory beds is not readily applicable on CFB boilers due to lack of confident scaling criteria. Hence, before further mathematical modelling and laboratory experiments are made of heat transfer phenomena related to CFBB's, some ideas are needed of the processes taking place in such boilers. This paper aims at giving an overview of the heat transfer characteristics of a CFB combustion chamber, and the influence from various design and operational parameters.

Tab. 1. Fig. 8. Bibl. It.

УДК 66.095.5

Bastani A., Fiebig M., Mitra M.K. COMPUTATION OF HEAT TRANSFER WITH PERIODICALLY FULLY PEVELOPET FLOWS BETWEEN FINS OF A COMPACT HEAT EXCHIANGER // Тепломасообмен-ММФ-92. Вычислительный эксперимент в задачах тепломассообмена и теплопередачи. Т. 10, - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. – С. 19-28.

A numerical scheme has been developed to compute the flow field between neighboring fins of a compact f1n-tube heat exchanger. Exemplary computations show that at low Reynolds number 400) the Nusselt number 1n the neighborhood of the second tube of a two-tube In-line configuration is close to the Nu given by the periodically fully developed flow.

Fig. 6. Bibl. 8.

УДК 536.24

Boriaru N.. Petrescu S. TRANSITORY HEAT TRANSFER INSIDE CYLINDRICAL FINS // Тепломассообмен-ММФ-92. Тепломассообмен в энергетических устройствах. Т. 10. - Минск: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 130-134.

Regarding the fin as a thermodynamic system, different types of entering signals, i.e. temperature change et the base (step type, polynomial and sinusoidal) were applied. Its response, the temperature distribution , as well as the corresponding heat flux, have been calculated end graphically represented, starting from the unsteady energy conservation equation, considering also the convective heat transfer to the ambient and using an implicit second order difference technique.

Fig. 4. Bibl. 4.

УДК 536.24

Boyadjiev C.B. ON THE KINETICS OF THE INTENSIVE INTERPHASE MASS TRANSFER // Тепломассообмен-ММФ- 92. Тепломассообмен в химико-технологических устройствах. Т. II. - Минск: АНК «ИТМО им. А.В. Лыкова» АНБ, 1992. – С. 15-26.

Theoretical results for the influence of the intensive interphase mass transfer (resulting from large concentration gradients) on the nonlinear mass, heat and multicomponent mass transfer and interphase mass transfer between gas and liquid are presented.

The significant influence of the direction of the intensive interphase mass transfer on the kinetics of the transfer processes is shown.

Tab. 2. Fig. 4. Bibl, 9.

УДК 536.24+532.72

Onken U. HYDRODYNAMICS AND MASS TRANSFER IN LARGE BUBBLE COLUMN REACTORS // Тепломассообмен-ММФ-92. Тепломассообмен в химико-технологических устройствах. Т.Н. - Минск» АНК "ИТМО им. А.В. Лыкова", АНБ, 1992. - С. 70-79.

With increasing size of bubble column reactors the distribution of dissolved gas concentration and its effect on mass transfer are becoming most important for reactor design and operation. Models for this purpose require knowledge of two-phase flow in bubble columns. An essential feature of hydrodynamics in these reactors is large-scale circulation of the liquid phase, as has been experimentally confirmed by various researchers. Based on this flow structure models have been developed in which liquid phase mixing is described by isotropic dispersion. Using advanced measuring techniques we have been able to determine local vectors of fluid-dynamic parameters not only as time averaged values but also the corresponding high-frequency fluctuations. As to liquid phase mixing the vectors of turbulence intensity are of particular importai.ee. From our experimental results we conclude, that in a realistic model for liquid mixing axial and radial dispersion have to be separated. The axial dispersion coefficient is directly related to the axial turbulence intensity, which can be predicted on the basis on the energy balance. An approach of the prediction of radial dispersion is proposed.

Fig. 8. Bibl. 13.

УДК 66.047

Zaborszki P. .Schulz H.-H. .Brandaue г E. THE INFLUENCE OF ROUGH SURFACES ON THE CRITICAL POINT OF THE DRYING PROCESS // Тепломассообмен-ММФ- 92. Тепломассообмен в химико-технологических устройствах. Т. II. - Минск: АНК «ИТМО им. А.В. Лыкова» АНБ, 1992. - С. 105-108.

We show that it is possible to describe all drying; periods with a simple model on the basis of changing mass transfer interfaces. Conditions for the use of this model are the following characteristics surface roughness, pore size distribution, particle size distribution.

Fig. 2. Bibl. 3.

УДК 536.24

Boizan Justiz M.A. SCALE-UP FOR THE PRODUCTION OF SYNTHETIC ZEOLITES // Тепломассообмен-ММФ-92. Тепломассообмен в химико-технологических устройствах. Т. 11. – МИНСК: АНК "ИТМО им. А.В. Лыкова" АНБ, 1992. - С. 210-214.

In this work the description of the technological schemes for the production of synthotic zeolites according with the batch and the continuos operations is given. The experimental data obtained during the scale-up and optimization of the ionic exchange, the liquid-solid extraction, the kinetics of the crystallization and other fundamental processes are given, together with the economic evaluation of the industrial production of synthetic zeolites.

Bibl. 9.