On the Mechanism of the Process of Heat- and Mass-Transfer During Evaporation Cooling of Strongly Heated Surfaces

layer to the plane B distant from it at twice the length of the free molecular path, Eq (1) (where n_r and w_r are the number of molecules per unit volume and their mean velocity, N - Avogadro number, C_{vg} specific heat of one mole of the gas) and remembering that the pressure of a mixture p_c is the sum of the partial pressures of a given gas p_r and the diffusing substance p_d Eq (4) is derived.

Note: Throughout this article the meaning of the suffixes is as follows: g (Г in the Russian text) - gas, d (Д in the Russian text) - diffusing substance, c - mixture of the two, ж, б, o - parameters at the wall, at the outer edge of the boundary layer and outside the boundary layer, respectively.

Then following the same assumptions as were made in deriving expressions for the thermal conductivity of the gases (Ref 8), using Eq (5) in which λ_{gd} is the

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On the Mechanism of the Process of Heat- and Mass-Transfer During Evaporation Cooling of Strongly Heated Surfaces

coefficient of heat conduction of the gas when diffusion is present, M_g is the molecular weight and μ_g is the viscosity of the gas and relating this with the corresponding heat conduction coefficient without diffusion, λ_g (Eq 6), it is found that the two coefficients differ by the pressure ratio p_r/p_c. The partial pressure p_g of the gas varies across the boundary layer and therefore an expression for the mean value of the heat conduction coefficient $\bar{\lambda}_{gd}$ is introduced (Eqs 8 and 9), δ being the thickness of the boundary layer. Employing now the Stefan relation, Eq (10), for the diffusive process, (g_d being the diffusion flux and k_p the coefficient of diffusion), integrating it on the assumption that k_p = const and combining the result with Eq (9), the relation Eq (12) is obtained which also can be expressed by Eq (14). Fig 2 shows the variation of $\bar{\lambda}$ with

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On the Mechanism of the Process of Heat- and Mass-Transfer During Evaporation Cooling of Strongly Heated Surfaces

temperature in the undisturbed stream (tgo); the curves 1 and 2 refer to the dry and 20% wet air, respectively, without diffusion, curve 3 represents p_{gH}/p_{gT} versus t (p_{gT} is the logarithmic mean value of the partial pressure of the given gas as expressed by Eq (13), while curves 4 and 5 refer to the dry and 20% wet air respectively, when diffusion of the water vapour is taking place. The experimental data of H. Seifert et al. (Ref 12) agree with these graphs. When no diffusion takes place heat transfer from hot gases to a wall is usually determined by the Nusselt number Nu as given by Eqs (15) and (16) for the external and internal flows respectively. To account for the effect of diffusion on the heat transfer, Eq (14) can be used in the manner shown in Eq (17), this results in Eqs (19) and (20) instead of Eqs (15) and (16). When the partial pressures of the diffusing

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substance at the surface is not very high the mass transfer due to diffusion may be determined by Eq (21), the suffix D denoting the diffusion criteria. For higher partial pressures and especially when liquid temperatures are near the boiling point of the given pressure of the mixture, it is necessary to use Stefan's equation of diffusion (Eq 24) instead of that of Fik (Eq 22), which eventually leads to Eq (26) for the external and Eq (27) for the internal flows. The diffusive Nusselt number is based on the temperature of the liquid and the other number on the temperature of the gases. To determine the temperature of the liquid the analysis starts with Eqs (28) and (30) which together lead to Eq (32), so that the temperature of the liquid may be found if the relation between the partial pressure of the diffusing liquid is known as a function of the temperature of the liquid. Fig 3 shows the relationship between the temperature of the liquid ($t_{жк}$)

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On the Mechanism of the Process of Heat- and Mass-Transfer During Evaporation Cooling of Strongly Heated Surfaces

and the temperature of the gases outside the boundary layer (t_{go}) as determined by Eq (32) for various pressure conditions. The few experimental data available are also introduced in the figure, viz. o - from D. I. Polishchuk (Ref 13) and Δ from G. R. Kinney (Refs 14 and 15). The agreement is considered good. Finally the amount of the evaporated liquid per unit area and unit time is determined, Eq (34), and the effectiveness of the cooling is then analysed. This is defined as the relative specific evaporation of the liquid g_d/g_g, i.e. the ratio of the evaporated liquid per unit area of the cooled surface to the rate of flow of the gases per unit area normal to the direction of the flow. Its value is given by Eq (35), and this is plotted in Fig 4 (graphs 1, 2 and 3) for the case that water is being evaporated from the internal surface of the tube in hot air. These curves are compared with

S/147/60/000/01/011/018
E022/E535

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the theoretically developed relations of L. Crocco (Ref 4) and E. Knuth (Ref 5) (graphs 5 and 4 respectively), as well as with their no diffusion alternatives as given by Eqs (36) and (37) (graphs 6 and 7 respectively). The small deviations from each other of the Crocco graphs (5 with diffusion, 6 without diffusion) seem to indicate that the factors considered by him do not influence greatly the heat transfer rates, but the large difference between the curves 1 and 7, the former taking into account the variation of the heat conduction and the latter neglecting it, indicate clearly the strong effect of this factor on the heat- and mass-transfer. The article concludes with the statement that the diffusion caused increase in the thermal resistance of the boundary layer appears to be the cause of the widely known but theoretically unexplained fact that cooling of walls which are placed in hot air streams by injecting air or nitrogen is not as effective

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S/147/60/000/01/011/018
E022/E535

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as by injecting hydrogen, quickly evaporating liquids or other substances which diffuse perfectly in air. There are 4 figures and 18 references, 11 of which are Soviet, 7 English.

ASSOCIATION: Kafedra soprotivleniya materialov, Kazanskiy aviatsionnyy institut (Chair on Strength of Materials, Kazan' Aviation Institute)

SUBMITTED: April 30, 1959

Card 9/9

S/139/60/000/03/016/045
E032/E314

AUTHOR: Alimov, R.Z.

TITLE: Approximate Method for Taking Into Account the Effect of Diffusion on the Thermal Conductivity of Gases in the Boundary Layer

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1960, Nr 3, pp 97 - 102 (USSR)

ABSTRACT: Using the kinetic-theory discription of thermal conductivity, an analysis is given of the effect of diffusion of vapour adiabatically evaporating from a liquid on the heat exchange between the liquid and a surrounding hot gas. Simplified calculations show that the stream of evaporated vapour diffusing in the direction opposite to the heat flow tends to reduce the heat exchange through a reduction in the thermal conductivity of the boundary layer.
There are 2 figures and 4 Soviet references.

Card1/2

S/139/60/000/03/016/045
E032/E314

Approximate Method for Taking Into Account the Effect of Diffusion on the Thermal Conductivity of Gases in the Boundary Layer

ASSOCIATION: Kazanskiy aviatsionnyy institut
(Kazan Aviation Institute)

B

SUBMITTED: April 6, 1959

Card 2/2

S/170/60/003/005/005/017
B012/B056

AUTHOR: Alimov, R. Z.

TITLE: Heat and Mass Exchange in Cooling by Evaporation of Surfaces Heated to High Temperatures

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 5, pp. 31 - 39

TEXT: The thermal flux of hot gases to the surface of a solid coated with a thin liquid film is accompanied by a vapor current of opposite direction. The presence of a diffusion current of a direction opposite to that of the heat flux considerably modifies the thermal conductivity of the medium in the boundary layer. The processes of heat and mass exchange occur mainly in the boundary layer. The molecules of the diffusing substance shift between the molecules of the hot gas in the direction leading away from the wall and cause a specific current of the diffusing substance. It is assumed that this current, which is inverse to the heat flux and gradually heated, does not participate in the heat transfer of gases to the wall. The last process is caused only by the

gas molecules, the concentration of which decreases continuously during their approach to the wall. The criterial equations (17) and (18) for heat exchange as well as (24) and (25) for mass exchange are derived. These equations take account of the interaction of heat and vapor currents through the boundary layer and their influence upon the heat-transfer and diffusion coefficients, as well as of the Stefan flow. Formula (28) is derived, from which it may be seen that the temperature of the evaporating liquid does not depend on the Re-number of the flow round the wall. Fig. 3 shows the curves calculated from formula (28) for the relation between the temperatures of the liquid and the gas in the case in which the water evaporates in the air-current, and the experimental data are given. From this figure it may be seen that the experimental data agree with calculated ones. Formula (30) is written down for determining the efficiency of cooling. Fig. 4 shows the curves calculated from equation (30) for the dependence of the relative quantity of liquid on the gas-temperature in the evaporation of water from the inner surface of a cylinder tube through which hot air is passing. The temperatures and quantities of liquid determined from these equations

Heat and Mass Exchange in Cooling by Evaporation of Surfaces Heated to High Temperatures

S/170/60/003/005/005/017
B012/B056

are compared in Fig. 4 with theoretical and experimental data obtained by other authors (Refs. 5,6,14) and those by O. Lyuts (Ref. 15). There are 4 figures and 16 references: 14 Soviet and 2 US.

ASSOCIATION: Aviatsionnyy institut, g. Kazan' (Aviation Institute, Kazan')

Card 3/3

ALIMOV, R.Z.

Unit for checking sliding contacts used in measuring the temperature of rotating objects. Izm.tekh. no.4:31-32 Ap '60. (MIRA 13:8)

(Thermometry)

ALIMOV, R.Z.

Heat and mass transfer during the cooling, by evaporation, of surfaces heated to high temperatures. Inzh.-fiz.zhur. no.5:31-39 My '60.
(MIRA 13:8)

1. Aviatsionnyy institut, Kazan'.
(Mass transfer) (Heat—Transmission)

ALIMOV, R. Z.

"Heat and Mass Transfer in Tubes at Two-phase Vortex."

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, June 1961.

S/115/61/000/008/008/009
E194/E119

AUTHOR: Alimov, R.Z.

TITLE: Graphical methods of calculating individual parameters of flowmeters with standard apertures

PERIODICAL: Izmeritel'naya tekhnika, no.8, 1961, 49-53

TEXT: The object of this article is to popularise two existing but little known graphical methods. The first of these was described in detail by R.H. Nilberg (Ref.1: Ein Nomogramm für Blenden und Düsen. Archiv für technisches Messungen (ATM), 1958, Lieferung 269). He used the flow equation for a differential manometer flowmeter operating with standard apertures:

$$G = 0.01252\varepsilon\alpha m D^2 \sqrt{\Delta P \gamma} \qquad (1)$$

The second method uses a nomogram based on the equation of flow, and the relationship between the pressure drop in the constricting device, P_n, and m. From this nomogram the upper limit of the pressure difference of a differential manometer, and the pressure loss P_n are determined as a function of the parameter

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Graphical methods of calculating ... S/115/61/000/008/008/009
E194/E119

$$C = \alpha m \sqrt{\Delta p}$$

The parameter C is plotted against P_m (kg/cm^2) for differential pressure manometer readings. This parameter C may be used to assess the value of the main parameters of a flowmeter with a limited value of pressure drop in the constricting device. The nomograms are simple to use, and may be used in combination. There are 3 figures and 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc.

Card 2/2

ALIMOV, R.Z.

Intensification of mass transfer by means of toroidal gas current.
Zhur.prikl.khim. 35 no.3:524-529 Mr '62. (MIRA 15:4)
(Mass transfer)

26.2252

35931
S/024/62/000/001/002/013
E195/E135

AUTHOR: Alimov, R.Z. (Kazan')

TITLE: The use of swirling two-phase flow for the purpose of intensifying convective heat and mass exchange in pipes

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Energetika i avtomatika, no.1, 1962, 101-110

TEXT: The limitation of single-phase swirling flows for heat-exchange purposes has been apparent for some time. The use of swirling gas flows has not resulted in significant improvement in convective heat transfer, whilst liquids present the problem of bulk transportation with a consequent loss of energy. The author carried out an experimental study of heat exchange properties of two-phase swirling flow. He succeeded in planting a film of water droplets on the internal wall of a heated vertical porcelain pipe (inside diameter 40 mm, length 1200 mm) carrying a swirling stream of air. Analysis of the results led

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to the following conclusions. 1) By injecting liquid into a swirling flow of gas it is possible to produce thin, continuous and stable liquid films on the internal surface of a cylindrical pipe. 2) By varying the Reynolds number within the range 2×10^4 - 8×10^4 in the swirling flow, the Nusselt diffusion criterion can be increased to double that of a non-swirling flow; this indicates a considerable intensification of heat and mass transfer processes. 3) A heat-exchange coefficient of the order 2400-2900 kcal/m^2/hr/°C was obtained for a heat-flow rate of 75000 kcal/m^2/hr in this range of Reynolds number; this is 40-70 times higher than that for non-swirling flow and 8-20 times greater than that for a single-phase swirling flow: the total resistance, however, increases by a factor of 7. 4) Under comparable temperature and energy loss conditions, the use of single-phase swirling flow will result in a net gain of 2-2.5 times in heat transfer rate in comparison with non-swirling flow. The introduction of two-phase swirling flow would produce an additional gain of 3-20 times that of swirling one-phase flow. Finally, the author suggests that there is considerable scope

for an improvement in the design of swirl-producing devices, which would result in yet greater intensification of heat-exchange processes. This method has many technological applications, particularly in cooling highly heated surfaces. There are 9 figures.

SUBMITTED: February 2, 1961

Card 3/3

ALIMOV, R.Z. (Kazan')

Intensification of convective heat and mass exchange in pipes using a swirling two-phase flow. Izv. AN SSSR. Otd. tekh. nauk. Energ. i avtom. no.1:101-110 Ja-F '62. (MIRA 15:3)
(Thermodynamics)

ALIMOV, R.Z.

Some peculiarities in the breakage of specimens with several annular grooves subjected to tension. Trudy KAI no.62:171-174 '61.
(MIRA 17:2)

ALIMOV, R.Z.; KAZARINOV, V.G.; NEVEROV, A.M.

Using a device with a volumetric pickup in measuring thin liquid films. Izm. tekh. no.9:16-19 S '64. (MIRA 18:3)

L 11863-65 EWT(l)/EWP(m)/EWT(m)/EWA(d)/EPR/EWA(l) Pd-1/Ps-4/P1-4 AEDC(a)/
ASD(a)-5/SSD/AFWL/ASD(f)-2/AFETR/ESD(gs)/ESD(t) WW/JD
ACCESSION NR: AP4044874 S/0020/64/157/006/1314/1315

B

AUTHOR: Alimov, R. Z.

TITLE: Concerning one stable shape of the free surface of a thin layer of a rotating liquid

SOURCE: AN SSSR. Doklady, v. 157, no. 6, 1964, 1314-1315

TOPIC TAGS: rotating liquid film, wave propagation in liquid film, hydromechanics, Reynolds number

ABSTRACT: Thin layers of rotating liquid were produced on the inner surface of cylindrical tubes by spraying water from a centrifugal atomizer into a twisted air stream. The air twisting was accomplished by blowing air through tangential slits. The thin liquid layer thus formed was carried away by the twisted air stream and represented a continuous rotating film. It could be observed through a glass window. At low speed of the air, the film was perfectly smooth. At a smaller tube diameter and at increased speed of rotation, ring waves appeared on the film surface. It seems that they are connected with the Reynolds number reaching a critical value. From the wave equation for the rotating thin film, one

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L 14863-65

ACCESSION NR: AP4044874

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obtains the velocity of wave propagation in terms of the average speed of the film rotation and its thickness. The author is grateful to correspondent member AN SSSR L. N. Sretenskiy for his interest Orig. art. has: 2 figures

ASSOCIATION: Kazanskiy aviatsionnyy institut (Kazan' Aviation Institute)

SUBMITTED: 19Dec63 ENCL: 00

SUB CODE: ME NO REF SOV: 003 OTHER: 001

Card 2/2

L 31083-65 EWT(1) EPF(c)/EPF(n)-2/EPR/T/EPA(bb)-2/EWA(1) Pr-4/Pa-4/Pu-4 WW

ACCESSION NR: AP5006301 S/0096/65/000/003/0081/0085

38
37
13

AUTHOR: Alimov, R. Z. (Candidate of technical sciences)

TITLE: Hydraulic resistance and heat and mass transfer in a vortex flow

SOURCE: Teploenergetika, no. 3, 1965, 81—85

TOPIC TAGS: vortex flow, hydraulic resistance, heat transfer, mass transfer, vortex tube

ABSTRACT: Hydraulic resistance and heat and mass transfer at various degrees of vorticity in air flow were investigated in a vortex tube 2 m long and 200 mm in diameter, in which wall and air temperatures were maintained at 500 and 400C, respectively, and the air flow rate at 5000 m^3/hr, under a [illegible]-atm pressure. It is shown that flow vortex results in a strong intensification of heat and mass transfer, apparently caused by flow acceleration as well as by intensification of internal processes brought about by additional vortex formation in the field of centrifugal forces. More power is required to displace the medium in a vortex flow with other conditions equal. It appears that

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L 31083-65
ACCESSION NR: AP5006301

the most economical regime with respect to power are those corresponding to moderate degrees of vorticity, which in the case considered are located in the region where the ratio of the pipe cross section to the total area of the inlet slits is between 0.5 and 5.0. It is also shown that the hydraulic resistance at moderate flow rates remains the same for both single- and two-phase flows. Orig. art. has: 8 formulas and 6 figures. [AC]

ASSOCIATION: Kazanskiy aviatsionnyy institut (Kazan Aviation Institute)

SUBMITTED: 00 ENCLOSURE: 00 SUB CODE: ME

NO REF SOV: 007 OTHER: 002 ATD PRESS: 3198

Card 2/2

L 27153-66 EWT(1)/EWP(m)/ETC(f)/EPF(n)-2/EWG(m)/EWA(d)/ETC(m)-6/EWA(1) WW
ACC NR: AP6012671 SOURCE CODE: UR/0170/66/010/004/0437/0446

AUTHOR: Alimov, R. Z.

ORG: Aviation Institute, Kazan (Aviatsionnyy institut)

TITLE: Hydraulic resistance and heat transfer in a twisted flow

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 10, no. 4, 1966, 437-446

TOPIC TAGS: hydraulic resistance, fluid friction, heat transfer, centrifugal force, vortex tube, vortex flow

ABSTRACT: The results are given of the experimental investigation of friction and heat mass transfer in cylindrical tubes. The diameter of the tubes ranged from 15.6 to 20.2 mm. Different vorticities were obtained by variation of the geometric parameter A_T defined by the relation $A_T = F_T/F_t$, where F_T is the cross-sectional area of the tube and F_t is the total cross-sectional area of the slots. To analyze the heat mass transfer, water was injected into the tubes. This was followed by deposition of water drops, due to centrifugal force, on the inside walls of the tubes, which resulted in a thin water-film covering the whole length of the tubes. Friction and heat mass transfer were found to be considerably higher in this flow than in an ordinary axial flow. Comparative analysis reveals the range of A_T which corresponds to the minimum power supply. Orig. art. has: 4 figures and 8 formulas. [NT]

SUB CODE: 20/ SUBM DATE: 19Jun65/ ORIG REF: 014/ OTH REF: 001
Card 1/1 BK UDC: 536.244+532.501.312

L 26277-66 EWP(m)/EPF(n)-2/EWT(l)/ETC(f)/EWG(m)/EWA(d)/EWA(l) WW
ACC NR: AP6014070 SOURCE CODE: UR/0294/66/004/002/0238/0241

68
B

AUTHOR: Alimov, R. Z.

ORG: Kazan Aviation Institute (Kazanskiy aviatsionnyy institut)

TITLE: Some characteristics of evaporative cooling by a swirling flow

SOURCE: Teplofizika vysokikh temperatur, v. 4, no. 2, 1966, 238-241

TOPIC TAGS: heat transfer, evaporative cooling, film cooling, cooling rate

ABSTRACT: The cooling of the inside wall of an externally heated cylindrical pipe by a water film evaporating in a swirling flow of air was studied experimentally. The experimental arrangement consisted of a thermally insulated vortex tube, 15.6 mm inside diameter and 20 mm long, which was electrically heated by a nichrome strip (heating element) wound around the tube. Water was injected into the tube, in which a swirling flow of air was maintained, at a rate sufficient to produce a continuous film along the inside surface. The mass transfer and film temperature variation along the tube length were measured. The obtained results show that the presence of a swirling flow results in a considerable increase in the rate of heat removal per unit weight of cooling agent (air) and also in a marked increase in hydraulic resistance. This characteristic can be useful in cases where the removal of large quantities of heat by a limited amount of coolant is needed. The effect of film discontinuity on the heat transfer was also investigated. The results showed that the

Card 1/2 UDC: 536.248.2

L 26277-66
ACC NR: AP6014070 O

discontinuity in the water film produces high temperature gradients on the pipe wall. However, no local residual deformation of the pipe was noticed. Orig. art. has: 5 figures. [AS]

SUB CODE: 21/ SUBM DATE: 24Dec64/ ORIG REF: 003/ OTH REF: 001/ ATD PRESS: 4243

Card 2/2 CC

ALIMOV, S.; NAUMENKO, G.

Joint control. Fin. SSSR 22 no.8:72-74 Ag '61.
(MIRA 14:8)

1. Zamestitel' upravlyayushchego Stalingradskoy kontoroy Gosbanka (for Alimov). 2. Zamestitel' zaveduyushchego Stalingradskim oblfinotdelom (for Naumenko).
(Stalingrad Province--Auditing)

ALIMOV, Sh.A., professor; IMAMOV, I.Kh.

Combined antibacterial and tuberculin therapy of pulmonary and extrapulmonary tuberculosis. Probl. tub. no.6:38-42 N-D '54. (MLRA 8:1)

1. Iz klinicheskogo otdeleniya Uzbekskogo nauchno-issledovatel'skogo tuberkuleznogo instituta (zav. klinikoy-prof. Sh.A.Alimov)

(TUBERCULOSIS, PULMONARY, therapy
PAS, streptomycin & tuberculin)
(PARA-AMINOSALICYLIC ACID, ther.
tuberc. pulm., with streptomycin & tuberculin)
(STREPTOMYCIN, ther. use
tuberc., pulm., with PAS & tuberculin)
(TUBERCULIN, ther. use
tuberc., pulm., with PAS & streptomycin)

ALIMOV, Sh.A., doktor meditsinskikh nauk.

Phthivazide in the therapy of pulmonary and non-pulmonary tuberculosis. Sov.med.18 no.1:22-26 Ja '54. (MLRA 7:1)

1. Iz klinicheskogo otdeleniya Uzbekskogo nauchno-issledovatel'skogo tuberkuleznogo instituta. (Tuberculosis)

ALIMOV, Sh.A., prof.

Antibacterial and immunological treatment of tuberculosis. Sbor. trud. Uz. nauch.-issl. tub. inst. 3:7-17 '57. (MIRA 14:5)
(TUBERCULOSIS)

ALIMOV, Sh.A., prof.

Course of pulmonary tuberculosis in trichodesmotoxicosis. Sbor. trud. Uz. nauch.-issl. tub. inst. 3:47-54 '57. (MIRA 14:5)
(TUBERCULOSIS) (UZBEKISTAN--TRICHODESMA--TOXICOLOGY)

ALIMOV, Sh.A., prof.; ABDURASHITOVA, M.V.

Results of further observations on the therapeutic effectiveness of phthivazid. Sbor. trud. Uz. nauch.-issl. tub. inst. 3:65-69 '57. (MIRA 14:5)

(ISONICOTINIC ACID) (TUBERCULOSIS)

USSR/Pharmacology and Toxicology. Chemotherapeutic Preparations V-7
Antitubercular Drugs

Abs Jour : Ref Zhur - Biol., No 15, 1958, No 71292

Author : Alimov Sh.A., Azarnykh M.A.
Inst : Uzbekistan Scientific Research Tuberculosis Institute
Title : Metazid in the Treatment of Patients Affected with Pulmonary Tuberculosis

Orig Pub : Sb. tr. Uzb. n.-i. tuberk. in-t, 1957, 3, 76-82

Abstract : Forty-eight patients affected with various forms of pulmonary tuberculosis were treated with metazid (M) (product of the condensation of isoniazid with formalin) in doses of 0.2-0.3 g. 3 times a day before meals, per os. For a course of treatment, 20-50 g. of M (in 5 patients up to 80 g.) were used. In the outcome of the treatment with M, an improvement of the general condition (normalization of temperature, abatement of cough, reduction of catarrhal symptoms in the lungs, slowing down of E.S.R., increase in weight) was observed almost in all patients. In 6 out of 29 patients, bacteria

Card : 1/2

Abs Jour : Ref Zhur - Biol., No 15, 1958, No 71292

disappeared from the sputum. In 29 patients, positive roentgenological shifts were noted. In patients with fibrocavernous forms, a resorption of the pyogenic membrane with thinning of the wall and a decrease of the size of caverns, and in small caverns even their complete closing, were observed. Side effects of M were insignificant and were expressed by headache, pain in the cardiac region, and in one patient the occurrence of leukopenia; after interruption of the treatment of 2-3 days, all these symptoms disappeared. As to effectiveness, M does not present advantages over phthivazid, and in single cases it is inferior to it. -- O.V. Petrova

ALIMOV, Sh.A.; AZARNYKH, M.A.

Metacide in the treatment of tuberculosis. Dokl.AN Uz. SSR no. 4:63-66 '57. (MIRA 11:5)

1. Uzbekskiynauchno-issledovatel'skiy tuberkuleznyy institut. Predstavleno akad. AN UzSSR A.Yu. Yunosovym.
(Metacide) (Tuberculosis)

ALIMOV, Sh.A., prof.

Incidence of tuberculosis in Uzbekistan and ways of reducing it. Med.zhur.Uzb., no.6:3-12 Je '58. (MIRA 13:6)
(UZBEKISTAN--TUBERCULOSIS)

ALIMOV, Sh.A., prof.

Reply to E.I. ATAKHANOV. Vest.AMN SSSR 13 no.11:98-99 '58
(MIRA 11:12)

(UZBEKISTAN--MEDICINE)

ALIMOV, Sh. A., prof.; VOLOKHVYANSKIY, A.M., kand. med. nauk; TESENKO, I.F.

Collective farm tuberculosis sanatoria in the Uzbek S. S. R. Probl. tub. 36 no.8:3-5 '58. (MIRA 12:7)

1. Iz Uzbekskogo nauchno-issledovatel'skogo tuberkuleznogo instituta (dir. Sh. A. Alimov).
(UZBEKISTAN--TUBERCULOSIS--HOSPITALS AND SANATORIUMS)

ALIMOV, Shakir Alimovich; SHRAMKOVA, G.A. red.; AGZAMOV, K., tekhn. red.

[Chemical aspects and therapy in pulmonary tuberculosis] Klinika i terapiia tuberkuleza legkikh. Tashkent, Gos.med.izd-vo M-va zdravookhraneniia UzSSR, 1960. 146 p. (MIRA 14:6)
(TUBERCULOSIS)

ALIMOV, Sh.A., prof.

Importance of artificial pneumothorax in the over-all treatment of pulmonary tuberculosis. Med. zhur. Uzb. no.8:3-7 Ag '60. (MIRA 13:9)

(PNEUMOTHORAX) (TUBERCULOSIS)

ALIMOV, Sh.A., prof.; AZARNYKH, M.A.

Treatment of pulmonary tuberculosis with cycloserine. Med. zhur. Uzb. no.12:9-12 D '60. (MIRA 14:1)

1. Iz Uzbekskogo nauchno-issledovatel'skogo tuberkuleznogo instituta.
(TUBERCULOSIS) (ISOXAZOLIDINONE)

ALIMOV, Sh.A.; AZARNYKH, M.A.

Effectiveness of metazide in the treatment of pulmonary tuberculosis. Khim. i med. no.14:70-76 '60. (MIRA 14:12)

1. Klinicheskoye otdeleniye Uzbekskogo nauchno-issledovatel'skogo tuberkuleznogo instituta (dir. - prof. Sh.A.Alimov).
(TUBERCULOSIS) (METAZIDE)

ALIMOV, Sh.A.; ANDREYEV, I.S.; ZYRINA, L.V.

Characteristics of the preparation of ZnS - Cu electroluminophors. Izv. AN Uz. SSR. Ser. fiz.-mat. nauk no.4:52-56 '61. (MIRA 14:9)

1. Tashkentskiy gosuniversitet imeni V.I.Lenina.
(Luminescent substances) (Zinc sulfide)

ALIMOV, Sh.A., prof.

Organization of tuberculosis control in Uzbekistan. Probl.tub. 39 no.2:3-8 '61. (MIRA 14:3)
(UZBEKISTAN—TUBERCULOSIS—PREVENTION)

ALIMOV, Sh.A., prof.

International Symposium on Problems of Rehabilitation in Pulmonary Tuberculosis. Med. zhur. Uzb. no.9:74-79 S '61. (MIRA 15:2)
(TUBERCULOSIS--REHABILITATION, ETC.--CONGRESSES)

ALIMOV, Sh.A., prof.

Occupational therapy and finding suitable working conditions for persons having tuberculosis. Med. zhur. Uzb. no.12:8-16 D '61.
(MIRA 15:2)

1. Iz Uzbekskogo nauchno-issledovatel'skogo instituta tuberkuleza.
(TUBERCULOUS--EMPLOYMENT)

ALIMOV, Sh. A., prof.

Sanatorium treatment of pulmonary tuberculosis using ergotherapy.
Probl. tub. no.2:11-14 '62. (MIRA 15:2)

1. Iz Uzbekskogo nauchno-issledovatel'skogo instituta tuberkuleza.

(TUBERCULOSIS) (OCCUPATIONAL THERAPY)

ALIMOV, Sh.A.

[Problems in the prevention, treatment, and occupational rehabilitation of tuberculosis patients discussed at the 15th International Congress of Tuberculosis] Voprosy profilaktiki, terapii i trudoustroistva bol'nykh tuberkulezom na XV Mezhdunarodnom kongresse po tuberkulezu. Tashkent, Medgiz, UzSSR, 1960. 39 p. (MIRA 14:11)
(TUBERCULOSIS)

ALIMOV, Sh.A.; AKHRARKHODZHAYEV, A.A.

Therapy of pulmonary tuberculosis in elderly persons. Trudy TSIU 63:118-122 '63. (MIRA 17:9)

1. Kafedra legochnogo tuberkuleza Tashkentskogo instituta usovershenstvovaniya vrachey.

ALIMOV, Sh.A., prof.

Problems of regional tuberculosis epidemiology in Uzbekistan.
Probl. tub. 41 no.9:8-12 '63 (MIRA 17:4)

1.

SOV/137-59-12-26587

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 12, p 119 (USSR)

AUTHORS: Alimov, S.I., Zhiryakov, N.I., Feygin, V.I.

TITLE: An Automatic Programming Controller of the Heat Treating Process for Tungsten and Molybdenum Rods

PERIODICAL: Sb. materialov po avtomatiz. proiz. protsessov i dispetcherizatsii, Nr 3, Moscow, 1958, pp 84 - 93

ABSTRACT: The regulator is intended for automatic current control according to the given program in welding W and Mo rods. A "D-33" type ampère-meter of the ferrodynamic system serves as a unit to measure the intensity of the welding current through the transformer. The program is set-up by shaped cams rotated by a synchronous motor. The basic part of the controlling device consists of the "MRShch-PR" (or ERM-47) electronic unit of the regulator; the inductive coils are fastened on the master device (zadatchik) and the foil flag-indicators which can enter into the gaps between the coils are fastened to the pointer. Relay coils are switched

Card 1/2

An Automatic Programming Controller of the Heat Treating Process for Tungsten and Molybdenum Rods

into the electron unit outlet; they control the reversible contactors of the potential-controller motor. The controller makes it possible for one operator to attend 8 - 12 welding machines, raising efficiency by a factor of two and ensuring the strict maintenance of the set-up conditions for heating-up the rods.

A.S.

CHUKAN, B.K., kand. tekhn. nauk; ALIMOV, Sh.S., inzh.; KUZIN, B.N., inzh.

Gunite in construction. Prom. stroi. 42 no.3:27-28 '65. (MIRA 18:7)

ALIMOV, Stanislav Petrovich; LEYBSON, Mark Genrikhovich; KHODOVETS, Pavel Iosifovich; SAVINA, Z.A., vedushchiy red.; POLOSINA, A.S., tekhn.red.

[Increasing oil recovery; Sakhalin oil workers' practice] Intensifikatsiia dobychi nefti; opyt sakhalinskikh neftianikov. Moskva, Gos.nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry, 1961. 71 p. (MIRA 14:6)
(Sakhalin—Oil fields—Production methods)

ZHELDAKOV, Yu.N., inzh.; ALIMOV, Sh.S., inzh.

Making fibrous silicate slate. Stroi. mat. 5 no.5:9-10 My '59.
(MIRA 12:8)
(Rostov--Roofing, Slate)

FRANK, G.A., kand.tekhn.nauk; ALIMOV, Sh.S., inzh.

Additives are accelerators of the hardening of gunite. Sbor. trud. NII po stroi. ASiA [Rost.] no.6:83-91 '62. (MIRA 17:9)

CHUKAN, B.K., kand. tekhn. nauk; ALIMOV, Sh.S., inzh.;
BIRYUKOV, Yu.M., inzh.

Using a concrete sprayer for strengthening concrete and reinforced concrete structural elements. Prom. stroi. 41 no.11:44-45 N '63. (MIRA 17:2)

MIKHAYLOV, M.M.; MUKHAMEDOV, A.A.; RUDYUK, S.I.; ALIMOV, S.U.

High-temperature treatment as a means for increasing the productivity of thermal and chemical heat treatment processes. Izv.AN Uz.SSR.Ser.tekh.nauk 7 no.2:55-63 '63. (MIRA 16:4)

1. Tashkentskiy politekhnicheskiy institut.
(Steel—Heat treatment)

ALIMOV, T.Sh.

Ol'ga Nikolaevna Pavlova; on her 65th birthday and 40 years as a physician, teacher, and communal worker. Med. zhur. Uzb. no.4: 74-75 Ap '60. (MIRA 15:3)

(PAVLOVA, OL'GA NIKOLAEVNA, 1895-)

GRIGORYAN, N.A.; ALIMOV, T.U.

Two cases of amputatio interilio-abdominalis. Khirurgiia 41 no.4:138-139 Ap '65. (MIRA 18:5)

1. Klinika gospital'noy khirurgii (zav. - prof. A.Ya. Yasnogorodskiy) Andizhanskogo meditsinskogo instituta.

ALIMOV, U. A.

Reclamation of the new lands of the Central Fergana and the basic tasks of the public health system. Med.zhur.Uzb. no.10:72-74 O '58. (MIRA 13:6)

1. Direktor Andizhanskogo gosudarstvennogo meditsinskogo instituta.
(FERGANA--RECLAMATION OF LAND--HYGIENIC ASPECTS)

ALIMOV, U.A.; SOKOLOV, N.P.

[Echinococcal diseases and their prevention in the virgin lands] Ekhinokokkovye zabolevaniia i ikh profilaktika na novykh zemliakh osvoeniia. Tashkent, Uzmedgiz, 1959. 41 p. (MIRA 13:11)
(HYDATIDS)

ALIMOV, U. A., Cand. Med. Sci., — (diss), "Development of public health service in the Andizhansk Oblast and at the new lands of Central Fergan," Tashkent, 1961, 32 pp (Tashkent State Medical Institute) (KL-Supp 9-61, 188)

ABDULLAYEVA, A.A. (Andizhan) ; ALIMOV, U.A. (Andizhan); SOKOLOV, N.P. (Andizhan)

History of medicogeographical investigations in Central Asia and Kazakhstan. Vladimir Ivanovich Dal'. Sovet. zdravookhr. 12 no.1:80-84 '63 (MIRA 17:2)

AUTHORS: Alimov, V.; Morozov, V. SOV-107-58-9-28/38

TITLE: A School Public Address System (Shkol'nyy radiouzel)

PERIODICAL: Radio, 1958, Nr 9, pp 45 - 47 (USSR)

ABSTRACT: The PA system for schools consists of a powerful amplifier with provisions for relaying speech, grammophone records, radio broadcasts or radio diffusion broadcasts. The output, depending on how many of the tubes in the output stage are used, is 10-12 w or 20-22 w. The amplifier is designed to power 2 feeder lines at 120 v for driving P-10 street loudspeakers, and 2 individual lines for driving normal loudspeakers. The individual lines would have a maximum load impedance of 60 ohms and could take 5-7 LS working on 15 v. The feeder lines have a maximum load impedance of 1,200 ohms and could take 1 speaker each with 20 w output, or one speaker between them at 10 w output. The amplifier consists of a 2-stage pre-amplifier, and a penultimate stage, transformer coupled with the push-pull output stage. Bantam tubes are used throughout. For microphone work both stages of the pre-amplifier are used. The push-pull output stage uses 4 tubes but by only using 2 of these the output can be decreased when desired. The power unit uses a 5Ts4S keno-

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tron for full-wave rectification. The apparatus consumes 90 w for a 20 w output. An electron-tube output level indicator is built in and the amplifier is provided with a monitoring speaker with volume control. Details for the construction, alignment and operation of the PA system are given. There are 2 figures, 1 circuit diagram and 1 diagram.

1. Public address systems--Design 2. Public address systems --Performance 3. Public address systems--Instruction manuals

ALIMOV, V., nauchnyy sotrudnik; VRANGEL', L., nauchnyy sotrudnik; LEVINA, G., nauchnyy sotrudnik

An integrated series of plans for farm buildings and structures. Na stroi. Ros. no.5:7-9 My '61. (MIRA 14:7)

1. Nauchno-issledovatel'skiy institut zhilishcha Akademii stroitel'stva i arkhitektury SSSR.
(Farm buildings—Designs and plans)

ALIMOV, V. A.

"The Nervous Apparatus and Argentophilic Substance of the Vermiform Appendage During Appendicitis (Data)." Cand Med Sci, Tashkent State Medical Inst, Tashkent, 1953. (RZhBiol, No 7, Dec 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)
SO: Sum. No. 556, 24 Jun 55

USSR

COUNTRY :
CATEGORY : General Problems of Pathology. Tumors. Comparative Oncology. Human Neoplasms.
ABS. JOUR. : RZhBiol., No. 231958, No. 107149

AUTHOR : Alimov,V.A.
INST. :
TITLE : A Myxofibrosarcoma of the Urinary Bladder in a Two-Year-Old Child.

ORIG. PUB. : Za sots.Zdravookhr.Uzbekistana,1956,No.4, 80-82

ABSTRACT : The clinical picture and anatomopathological data of the autopsy are described in detail. Histologically, the tumor consisted of polymorphous cells with basophilic protoplasma and brightly staining nuclei of various forms. The stroma was formed by fine fibrous tissue with myxomatous degeneration. The tissue of the tumor on section had the appearance of fish flesh. The histological diagnosis: myxofibrosarcoma of the urinary bladder with renal metastases.

Card: 1/1

ALIMOV, V.A., kand.med.nauk; GAYDOVA, Ye.S., kand.med.nauk

Mortality from tumors as shown by data of the Autopsy Department of the Clinic of the Tashkent Medical Institute from 1946-1955. Med.zhur.Uzb. no.6:35-39 Je '58. (MIRA 13:6)

1. Iz kafedry patologicheskoy anatomii (zav. - prof. G.N. Terekhov) Tashkentskogo gosudarstvennogo meditsinskogo instituta.

(CANCER--MORTALITY)

ALIMOV, V.A., kand.med.nauk

Rare case of invagination of the large intestine in typhoid fever in an eleven months-old child. Med.zhur.Uzb. no.5: 64-66 My '58. (MIRA 13:6)

1. Iz kafedry patologicheskoy anatomii (zav. - prof. G.N. Terekhov) Tashkentskogo gosudarstvennogo meditsinskogo instituta.
(INTESTINES--INTUSSUSCEPTION) (TYPHOID FEVER)

ALIMOV, V.A., kand.med.nauk

Primary cancer of the liver in a three-year old child. Med.zhur.Uzb. no.1:80-81 Ja '59. (MIRA 13:2)

1. Iz kafedry patologicheskoy anatomii (zaveduyushchiy - prof. G.N. Terekhov) Tashkentskogo gosudarstvennogo meditsinskogo instituta.
(LIVER--CANCER)

ALIMOV, V.A., kand.med.nauk

Armored heart. Med. zhur. Uzb. no.11:67 N '60. (MIRA 14:5)

1. Iz kafedry patologicheskoy anatomii (zav. - prof. G.N.Terekhov) Tashkentskogo gosudarstvennogo meditsinskogo instituta.
(HEART--DISEASES)

ALIMOV, V.A., assistent

Cyst of the mesentery of the small intestine in a 4-year old boy. Med. zhur. Uzb. no. 2:68-69 F '61. (MIRA 14:2)

1. Iz kafedry patologicheskoy anatomii (zav. - prof. G.N. Terekhov) Tashkentskogo gosudarstvennogo meditsinskogo instituta.
(MESENTERY--DISEASES) (CYST)

ALIMOV, V.A., assistent; POLYAKOVA, G., student; MANULKIN, A., student; MATVEYEV, S., student

Atherosclerosis according to autopsy data of clinics of the Tashkent State Medical Institute collected during 12 years (1949-1960). Med. zhur. Uzb. no.4:51-54 Ap '63.

(MIRA 17:4)

1. Iz kafedry patologicheskoy anatomii (zav. - prof. G.N. Terekhov) Tashkentskogo gosudarstvennogo meditsinskogo instituta.

ALIMOV, V.A.; MAGNUPOVA, M.A.

Histomorphology of the organs of laboratory animals after the injection of haplophylidine. Uzb. biol. zhur. 7 no.4:37-39 '63
(MIRA 17:4)

1. Institut khimii rastitel'nykh veshchestv AN UzSSR.

VAVILOVA, M.P.; ALIMOV, V.A.

Some pathomorphological changes in experimental leishmaniasis in Cricetulus auratus infected with the Central Asian strains of Leishmania canis and Leishmania tropica major. Med. paraz. i paraz. bol. 32 no.6:648-655 N-D '63 (MIRA 18:1)

1. Iz Tashkentskogo nauchno-issledovatel'skogo instituta vaktsin i syvorotok.

MAGRUPOV, A.I.; KASYMKHODZHAYEV, E.S.; ALIMOV, V.A.

Clinical and anatomical characteristics of poliomyelitis. Sbor.nauch. trud.TashGMI 22:360-370 '62. (MIRA 18:10)

1. Kafedra patologicheskoy anatomii (zav. - prof. G.N.Terekhov) Tashkentskogo gosudarstvennogo meditsinskogo instituta i 3 detskoy infektsionnoy bol'nitsy Tashkentskogo gorodskogo otdela zdravookhraneniya (glavnyy vrach A.P.Udaleva).

DORMENKO, Vladimir Vladimirovich; MAKAROVA, T.I., retsenzent; ALLISON, V.D., retsenzent; spetsredaktor; KOSSOVA, O.N., redaktor; YAROV, E.M., tekhnicheskiy redaktor

[The production of frozen fish fillets] Proizvodstvo morozhenogo rybnogo file. Moskva, Pishchepromizdat, 1956. 42 p. (MLRA 10:2)
(Fish, Frozen)

SHAPOVALOV, S.I., dotsent, kand. tekhn. nauk; STYCHINSKIY, L.P., inzh.; ALIMOV, V.I., inzh.

Effect of patenting wire rod from the rolling temperature on the mechanical properties of wire. Stal' 25 no.6:570-572 Je '65. (MIRA 18:6)

1. Donetskiy politekhnicheskiy institut i Makeyevskiy metallurgicheskiy zavod.

[illegible] : Cultivated Plants. Commercial. Oleiferous. Sugar-Bearing.

ABS. JOUR. : [illegible] 5, [illegible], No. 20392

AUTHOR : Skryanin, F.A.; Akchurina, N.A.; Alimov, V.Z.
INST. : AS Uzbek SSR

TITLE : Several Properties of Ammoniate and Its Effectiveness.

ORIG. PUB. : V. sb. Ref. nauchno-issled. rabot po khlopkovodstvu. Tashkent, AN UzSSR, 1957, 193-198

ABSTRACT : Experiments conducted by the Academy of Sciences Uzbek SSR in Tashkentskaya Oblast in 1956 have shown that ammoniate (A) was nitrified under laboratory conditions by 70% in 13 days, under field conditions by nearly totally within less than 12 days. There is thus no cause to apply A fractionally under the fall plowing. When placing the entire annual rate of A during vegetation of the cotton, its effectiveness either equalled

CARD: 1/2

COUNTRY :
CATEGORY : Cultivated Plants.

ABS. JOUR.: Ref Zhur -Biologiya, No. 5 , 1959, No. 20392

Author :
INST. :
TITLE :

ORIG. PUB.:

ABSTRACT : that of ammonium nitrate or was higher. In view of the economy in producing and applying it it is completely reasonable to use A under cotton together with hard fertilizers.
--O.P. Mikhaylova

CARD : 2/2

J

Country : USSR
Category: Soil Science. Mineral Fertilizers.

Abs Jour: RZhBiol., No 13, 1958, No 82114

Author : Akchurina, N.A.; Alimov, V.Z.; Skryabin, F.A.
Inst : Inst of Agriculture, Uzbek SSR
Title : Characteristics and Effectiveness of Liquid Ammoniate Fertilizer.

Orig Pub: Sots. s.kh. Uzbekistana, 1957, No 3, 21-25.

Abstract: In 1956 the Institute of Agriculture of the Academy of Sciences Uzbek SSR established by laboratory, vegetative, field, and industrial experiments the expediency of the application of ammoniate, the preparation of which is 25-40% cheaper than the preparation of solid fertilizer. By placing full rates of N in the vegetation period, the ammoniate increased the harvest of cotton wool

Card : 1/2

Country : USSR J
Category: Soil Science. Mineral Fertilizers.

Abs Jour: RZhBiol., No 18, 1958, No 82114

(brand 108-f) 7% in comparison with N_{aa}. The process of nitrification of ammoniate was thoroughly completed in the soil on the 12th day, and the nitrate content of N in the soil was higher than with the application of N_{ua}. Applying only one part of the ammoniate under the plowing will not significantly increase the harvest.
-- V.D. Astaf'yeva

Card : 2/2

ALIMOV, Yevgeniy Vladimirovich; GENERSON, Bella Isaakovna; FILITTOVICH, K.A., red.

[Selection of the optimum technological process for the manufacture of foundry molds and cores for unit and small-lot production] Vybor optimal'nogo tekhnologicheskogo protsessa izgotovleniia liteinykh form i sterzhnei pri individual'nom i melkoseriinom proizvodstve. Leningrad, 1965. 18 p. (MIRA 18:7)

ALIMOV, Ye.V.; BRYUKHOVICHENKO, P.I.; TSYGANKO, L.Z.

New technological process of manufacturing large-size castings for power machinery by assembling molds from core blocks in a special jacket. Lit. proizv. 5:3-4 My '64. (MIRA 18:3)

24(3)

AUTHORS: Skrotskiy, G. V., Alimov, Yu. I.

SOV/56-35-6-24/44

TITLE: Ferromagnetic Resonance in a Circularly Polarized Electromagnetic Field of Arbitrary Amplitude (Ferromagnitnyy rezonans v polyarizovannom po krugu elektromagnitnom pole proizvol'noy amplitudy)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 6, pp 1481-1484 (USSR)

ABSTRACT: It is the aim of the present paper to analyze the exact solutions of the equations of motion of magnetization, viz. of the equation of the Bloch (Blokh)-type $\dot{\vec{M}} = \gamma[\vec{M}\vec{H}] + (\chi_o \vec{H} - \vec{M})/\tau$ as well as of the Landau-Lifshits equations (Ref 1) $\dot{\vec{m}} = \gamma[\vec{m}\vec{H}] + \alpha[\dot{\vec{m}}\vec{m}]$, $\alpha < 0$, where $\vec{m} = \vec{M}/M_s$ and $\vec{H} = \vec{H}_o + \vec{h}$. In the introduction, the respective experimental investigations carried out by Damon (Demon) (Ref 2), Bloembergen and Wang (Blumbergen and Vang) (Ref 3), as well as the theoretical investigation by Suhl (Sul) (Ref 1) are discussed in short. The present paper investigates the solutions of the aforementioned equations in a circularly polarized

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Ferromagnetic Resonance in a Circularly Polarized Electromagnetic Field of Arbitrary Amplitude

radio-frequency field of arbitrary amplitude as well as the part played by the paraprocess in ferromagnetics in strong radio-frequency fields. The mathematical treatment of the equations is carried out in a system of coordinates rotating in the $\vec{H}_0$-direction with the frequency of the radio-frequency field, in which the two equations assume the form $\tau\left[\vec{M}_0\Delta\vec{\omega}\right] + \chi_0\vec{H} - \vec{M}_0 = 0$ and $\left[\vec{m}_0\Delta\vec{\omega}\right] + \alpha(\vec{m}_0\vec{\omega})\vec{m}_0 = \alpha\vec{\omega}$ respectively. The explicit solutions for M_{oz}, M_{ox} and M_{oy} and for χ' and χ'' are investigated and graphically shown in form of diagrams (Figs 1-3); on the strength of these solutions, theoretical and experimental results are compared (Refs 2, 3). In conclusion, the possibilities of applying the formulae and their agreement with experimental results are discussed. There are 3 figures and 5 references, 1 of which is Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute)

SUBMITTED: June 23, 1958

24.2200

80125
S/141/59/002/06/006/024
E032/E314

AUTHORS: Ryzhkov, V.M., Skrotskiy, G.V. and Alimov, Yu.I.

TITLE: Phenomenological Theory of Free Precession of the Magnetic Moments of Atomic Nuclei

PERIODICAL: Izvestiya vysshikb uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 6, pp 884 - 891 (USSR)

ABSTRACT: A discussion is given of the conditions necessary to obtain the free precession of the nuclear magnetization vector of a specimen in the Packard-Varian method (Ref 2). The Packard-Varian method consists of the following. The specimen, which has a relaxation time of the order of a second, is magnetized by a sufficiently large auxiliary field H_o, perpendicular to the weak measured field h_o. When the auxiliary field is suddenly switched off, the magnetization vector M precesses about h_o with an angular velocity $\omega = \gamma h_o$. The coefficient γ is practically equal to the gyromagnetic ratio of the nuclei under investigation. In practice, the most important cases are those in which transient processes

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Phenomenological Theory of Free Precession of the Magnetic Moments of Atomic Nuclei

associated with the switching-off of the auxiliary field are damped out during a period of time which is considerably smaller than the relaxation time for the system of nuclear spins. In that case, the relation between the magnetization vector M and the field H is given by Eq (1), which describes the motion of the magnetization vector during the transient process. After the transient process is completed and when only the field h_o remains, the magnetization vector precesses freely, the appropriate equation being Eq (2). The latter equation was obtained in the previous paper by one of the present authors (Ref 12). When the transverse and longitudinal relaxation times are equal $T_{\parallel} = T_{\perp} = \tau$, the solution of Eq (2) is given by Eq (3). Such an approach to the problem enables one to consider independently the effect of the switching-off of the auxiliary field on the initial precession amplitude and

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the characteristics of the damping of the free precession signal. It is shown that when the frequency of the transient process ω is considerably greater than the precession frequency in the measured field h_o, the transient process has practically no effect on the initial amplitude of the precession signal even in the absence of damping. When the frequency of the transient process ω is smaller than the precession frequency, the transient process will have no effect on the initial amplitude of the precession signal only if it is heavily damped. In particular, if the auxiliary field is aperiodic ($\omega = 0$), the damping constant should be considerably greater than the precession frequency (Eq 6). A further effect considered is that of the influence of non-uniformity in the measured field on the damping of the free precession signal. Experiments on cylindrical specimens have shown that the effect of the nonuniformity in the magnetic field has a more complex nature than was

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Phenomenological Theory of Free Precession of the Magnetic Moments of Atomic Nuclei

supposed by Waters and Phillips (Ref 16). As a result of the superposition of the magnetic moments of different elements of volume in the specimen, all of which have different precession rates, additional maxima appear in the signal. The effect of non-uniformity can be neglected provided $\gamma G R_o \tau < 1$, where R_o is the radius of the specimen (Figure 3). For example, for a cylindrical specimen of distilled water for which the diameter is 10 cm, the relaxation time is 3 sec and $\gamma = 2.67 \times 10^4$ sec^{-1} Oe^{-1}, the non-uniformity may be neglected provided G is less than 2.5×10^{-6} Oe cm^{-1}. Figure 5 shows typical free precession signals for distilled water for $G = 6.1 \times 10^{-5}$ and 4.2×10^{-5} Oe cm^{-1}, respectively. The distance between the minima in the signal was found to be in good agreement with the calculations given in Ref 16. There are 5 figures, 1 table and 19 references, 8 of which are Soviet and 11 English.

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S/141/59/002/06/006/024
E032/E314

Phenomenological Theory of Free Precession of the Magnetic Moments of Atomic Nuclei

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute)

SUBMITTED: June 29, 1959

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16.9500 S/141/59/002/06/014/024
E192/E382

AUTHOR: Alimov, Yu.I.

TITLE: Overall Stability of the Equilibrium State of Relay-type Control Systems

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 6, pp 957 - 966 (USSR)

ABSTRACT: The system considered is described by the following operatorial equations:

$$Q(p)\Sigma(p) = R(p)Y(p) \; ;$$
$$Y(p) = -L\{k_p f(\sigma)\} \; ; \qquad (1)$$
$$f(\sigma) = \operatorname{sgn}\sigma \; ; \quad k_p > 0 \; .$$

The transfer function of the linear system is given by Eq (2), where the coefficients a_i and b_i are constants which satisfy Eqs (3). The real parts of all the roots of Eq (4) are negative. The differential stability criteria for Eqs (1) were found by a number of authors (Refs 1-3). In the following an attempt is made to determine the

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Overall Stability of the Equilibrium State of Relay-type Control Systems

criteria of the overall stability of the system. The method employed in the analysis is similar to that of Malkin (Ref 5). Further, in the analysis it is assumed that the system fulfils the conditions defined by Eqs (5). It is shown that Eqs (1) can be written as Eqs (6), where X and F are defined by Eqs (7). The Lyapunov function V for Eqs (6) and (7) is constructed. This is defined by Eqs (24), where the components of the functions are expressed by Eqs (20) and (21). In its final form the Lyapunov function can be written as Eq (28). The stability criteria can now be defined on the basis of the Lyapunov theorem. This states that if all the roots of the characteristic equation:

$$dx_i/dt = \sum_{s=1}^{n} p_{is} x_s \quad (i = 1, \ldots, n) \qquad (29)$$

have negative real parts, then independently of W_1 (Eqs 22), there exists only one V_1 of the same order

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