ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
Қ. И. Сәтпаев атындағы Қазақ ұлттық техникалық зерттеу университеті

Х А Б А Р Л А Р Ы

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
Казахский национальный исследовательский
технический университет им. К. И. Сатпаева

N E W S

OF THE ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
Kazakh national research technical university
named after K. I. Satpayev

SERIES
OF GEOLOGY AND TECHNICAL SCIENCES

5 (437)

SEPTEMBER – OCTOBER 2019

THE JOURNAL WAS FOUNDED IN 1940

PUBLISHED 6 TIMES A YEAR

ALMATY, NAS RK

NAS RK is pleased to announce that News of NAS RK. Series of geology and technical sciences scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of News of NAS RK. Series of geology and technical sciences in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential content of geology and engineering sciences to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Webof Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді геология және техникалық ғылымдар бойынша контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Известия НАН РК. Серия геологии и технических наук» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Известия НАН РК. Серия геологии и технических наук в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному контенту по геологии и техническим наукам для нашего сообщества.

Б а с р е д а к т о р ы

э. ғ. д., профессор, ҚР ҰҒА академигі

И.К. Бейсембетов

Бас редакторының орынбасары

Жолтаев Г.Ж. проф., геол.-мин. ғ. докторы

Р е д а к ц и я а л қ а с ы:

Абаканов Т.Д. проф. (Қазақстан)
Абишева З.С. проф., академик (Қазақстан)
Агабеков В.Е. академик (Беларусь)
Алиев Т. проф., академик (Әзірбайжан)
Бакиров А.Б. проф., (Қырғыстан)
Беспаев Х.А. проф. (Қазақстан)
Бишимбаев В.К. проф., академик (Қазақстан)
Буктуков Н.С. проф., академик (Қазақстан)
Булат А.Ф. проф., академик (Украина)
Ганиев И.Н. проф., академик (Тәжікстан)
Грэвис Р.М. проф. (АҚШ)
Ерғалиев Г.К. проф., академик (Қазақстан)
Жуков Н.М. проф. (Қазақстан)
Қожахметов С.М. проф., академик (Казахстан)
Конторович А.Э. проф., академик (Ресей)
Курскеев А.К. проф., академик (Қазақстан)
Курчавов А.М. проф., (Ресей)
Медеу А.Р. проф., академик (Қазақстан)
Мұхамеджанов М.А. проф., корр.-мүшесі (Қазақстан)
Нигматова С.А. проф. (Қазақстан)
Оздоев С.М. проф., академик (Қазақстан)
Постолатий В. проф., академик (Молдова)
Ракишев Б.Р. проф., академик (Қазақстан)
Сейтов Н.С. проф., корр.-мүшесі (Қазақстан)
Сейтмуратова Э.Ю. проф., корр.-мүшесі (Қазақстан)
Степанец В.Г. проф., (Германия)
Хамфери Дж.Д. проф. (АҚШ)
Штейнер М. проф. (Германия)

«ҚР ҰҒА Хабарлары. Геология мен техникалық ғылымдар сериясы».
ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)
Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» РҚБ (Алматы қ.).
Қазақстан республикасының Мәдениет пен ақпарат министрлігінің Ақпарат және мұрағат комитетінде 30.04.2010 ж. берілген **№10892-Ж** мерзімдік басылым тіркеуіне қойылу туралы куәлік.

Мерзімділігі: жылына 6 рет.
Тиражы: 300 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28, 219 бөл., 220, тел.: 272-13-19, 272-13-18,
http://www.geolog-technical.kz/index.php/en/

© Қазақстан Республикасының Ұлттық ғылым академиясы, 2019

Редакцияның мекенжайы: Қазақстан, 050010, Алматы қ., Қабанбай батыра көш., 69а.
Қ. И. Сәтбаев атындағы геология ғылымдар институты, 334 бөлме. Тел.: 291-59-38.

Типографияның мекенжайы: «Аруна» ЖК, Алматы қ., Муратбаева көш., 75.

Главный редактор

д. э. н., профессор, академик НАН РК

И. К. Бейсембетов

Заместитель главного редактора

Жолтаев Г.Ж. проф., доктор геол.-мин. наук

Редакционная коллегия:

Абаканов Т.Д. проф. (Казахстан)
Абишева З.С. проф., академик (Казахстан)
Агабеков В.Е. академик (Беларусь)
Алиев Т. проф., академик (Азербайджан)
Бакиров А.Б. проф., (Кыргызстан)
Беспаев Х.А. проф. (Казахстан)
Бишимбаев В.К. проф., академик (Казахстан)
Буктуков Н.С. проф., академик (Казахстан)
Булат А.Ф. проф., академик (Украина)
Ганиев И.Н. проф., академик (Таджикистан)
Грэвис Р.М. проф. (США)
Ергалиев Г.К. проф., академик (Казахстан)
Жуков Н.М. проф. (Казахстан)
Кожахметов С.М. проф., академик (Казахстан)
Конторович А.Э. проф., академик (Россия)
Курскеев А.К. проф., академик (Казахстан)
Курчавов А.М. проф., (Россия)
Медеу А.Р. проф., академик (Казахстан)
Мухамеджанов М.А. проф., чл.-корр. (Казахстан)
Нигматова С.А. проф. (Казахстан)
Оздоев С.М. проф., академик (Казахстан)
Постолатий В. проф., академик (Молдова)
Ракишев Б.Р. проф., академик (Казахстан)
Сеитов Н.С. проф., чл.-корр. (Казахстан)
Сейтмуратова Э.Ю. проф., чл.-корр. (Казахстан)
Степанец В.Г. проф., (Германия)
Хамфери Дж.Д. проф. (США)
Штейнер М. проф. (Германия)

«Известия НАН РК. Серия геологии и технических наук».
ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)
Собственник: Республиканское общественное объединение «Национальная академия наук Республики Казахстан (г. Алматы)
Свидетельство о постановке на учет периодического печатного издания в Комитете информации и архивов Министерства культуры и информации Республики Казахстан **№10892-Ж,** выданное 30.04.2010 г.

Периодичность: 6 раз в год
Тираж: 300 экземпляров

Адрес редакции: 050010, г. Алматы, ул. Шевченко, 28, ком. 219, 220, тел.: 272-13-19, 272-13-18,
http://nauka-nanrk.kz /geology-technical.kz

© Национальная академия наук Республики Казахстан, 2019

Адрес редакции: Казахстан, 050010, г. Алматы, ул. Кабанбай батыра, 69а.
Институт геологических наук им. К. И. Сатпаева, комната 334. Тел.: 291-59-38.

Адрес типографии: ИП «Аруна», г. Алматы, ул. Муратбаева, 75

E d i t o r i n c h i e f

doctor of Economics, professor, academician of NAS RK

I. K. Beisembetov

Deputy editor in chief

Zholtayev G.Zh. prof., dr. geol-min. sc.

E d i t o r i a l b o a r d:

Abakanov T.D. prof. (Kazakhstan)
Abisheva Z.S. prof., academician (Kazakhstan)
Agabekov V.Ye. academician (Belarus)
Aliyev T. prof., academician (Azerbaijan)
Bakirov A.B. prof., (Kyrgyzstan)
Bespayev Kh.A. prof. (Kazakhstan)
Bishimbayev V.K. prof., academician (Kazakhstan)
Buktukov N.S. prof., academician (Kazakhstan)
Bulat A.F. prof., academician (Ukraine)
Ganiyev I.N. prof., academician (Tadjikistan)
Gravis R.M. prof. (USA)
Yergaliev G.K. prof., academician (Kazakhstan)
Zhukov N.M. prof. (Kazakhstan)
Kozhakhmetov S.M. prof., academician (Kazakhstan)
Kontorovich A.Ye. prof., academician (Russia)
Kurskeyev A.K. prof., academician (Kazakhstan)
Kurchavov A.M. prof., (Russia)
Medeu A.R. prof., academician (Kazakhstan)
Muhamedzhanov M.A. prof., corr. member. (Kazakhstan)
Nigmatova S.A. prof. (Kazakhstan)
Ozdoyev S.M. prof., academician (Kazakhstan)
Postolatii V. prof., academician (Moldova)
Rakishev B.R. prof., academician (Kazakhstan)
Seitov N.S. prof., corr. member. (Kazakhstan)
Seitmuratova Ye.U. prof., corr. member. (Kazakhstan)
Stepanets V.G. prof., (Germany)
Humphery G.D. prof. (USA)
Steiner M. prof. (Germany)

News of the National Academy of Sciences of the Republic of Kazakhstan. Series of geology and technology sciences.
ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)
Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty)
The certificate of registration of a periodic printed publication in the Committee of information and archives of the Ministry of culture and information of the Republic of Kazakhstan N 10892-Ж, issued 30.04.2010

Periodicity: 6 times a year
Circulation: 300 copies

Editorial address: 28, Shevchenko str., of. 219, 220, Almaty, 050010, tel. 272-13-19, 272-13-18,
http://nauka-nanrk.kz/geology-technical.kz

© National Academy of Sciences of the Republic of Kazakhstan, 2019

Editorial address: Institute of Geological Sciences named after K.I. Satpayev
69a, Kabanbai batyr str., of. 334, Almaty, 050010, Kazakhstan, tel.: 291-59-38.

Address of printing house: ST "Aruna", 75, Muratbayev str, Almaty

N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF GEOLOGY AND TECHNICAL SCIENCES
ISSN 2224-5278
Volume 5, Number 437 (2019), 138 – 143 **https://doi.org/10.32014/2019.2518-170X.135**

UDC 622.323(574)

G. Zh. Moldabayeva, G. P. Metaxa, Zh. N. Alisheva

KazNTU named after K. I. Satpayev, Almaty, Kazakhstan.
E-mail: moldabayeva@gmail.com, gmetaksa@mail.ru, zhannat_86.2007@mail.ru

THEORETICAL BASES FOR THE IMPLEMENTATION OF THE PROCESSES TO REDUCE VISCOSITY IN THE CONDITIONS OF NATURAL RESERVATION

Abstract. A matrix of space-time interactions occurring at the phase interface for films of different origin has been developed. It shows the types of controlled processes and methods of influence on the phase boundary to obtain the specified properties.

Key words: phase boundary, oil, water, quartz, matrix, space-time.

The fact of the predominance of high viscosity oils in modern oil fields makes it necessary to search for new geotechnologies that will reduce the cost of hydrocarbons (HC). Therefore, our work develops the idea of using the field as a natural reactor. For the first time this hypothesis was expressed by Lomonosov [1]. Then it was convincingly substantiated [2-4, 11-16] by other researchers in different parts of the globe [5-8, 17-23]. In our work, laboratory studies have shown the viability of this hypothesis for two and three component phase boundary. In industrial conditions at the Embamunaygas field, the processes of hydrogenation under conditions of natural occurrence were carried out by the authors [5] in 2017. Here, the decomposition of water was carried out chemically using hydro-reactive substances based on activated aluminum. Positive results of laboratory [6] and industrial tests require theoretical substantiation to explain the mechanisms of hydrocarbon hydrogenation under conditions of natural occurrence. Due to the fact that all processes begin at the phase boundary of this state, special attention is paid, as the phase boundary has the properties of both phases that it shares.

For the nano-level consideration, a matrix of basic interactions within the space-time responses of various forms of fluid to external influences has been developed.

Table 1 shows the main responses (processes) for films of organic and inorganic compounds.

Table 1 – Software module of interaction on phase boundary (3x3) (nano-level consideration)

Consideration levels, m	Frequency range, $(Hz)s^{-1}$			
	Films of liquid metal melts10^{-12} -10^{-15}	Liquid film 10^{-12} -10^{-9}	Films of organic compounds 10^{-9} -10^{-6}	Type of controlled process
Electronic $> 10^{-12}$	Elastic and inelastic scattering (exo emission)	Ionization	Radiation chemical reactions (radiolysis)	Phase nonequilibrium
Crystallographic $> 10^{-9}$	PhotoTransformation	Surface active processes	Structuring, oxidation, reduction	Concentration disequilibrium
Textural $> 10^{-6}$	Heat generation	Sorption	Polymerization (synthesis, destruction)	Interfacial disequilibrium
The method of controlling the state of phase boundary	Changes in contact conditions for heterogeneous phases	Resonant interaction mode	Capacitive parameters of contacting phases	

The developed matrix, made in the coordinates of the space-time parameters of interfaces of different composition, has 3 consideration nano-levels:

- electronic, for scales>10^{-12} m;
- crystallographic, for scales characteristic of the crystalline state;
- structural - for the size of the molecular level of consideration.

Three types of interfaces, differing in the frequency of responses to external influences, are considered:

- films of liquid melts;
- films of liquids of inorganic substances;
- films of organic substances.

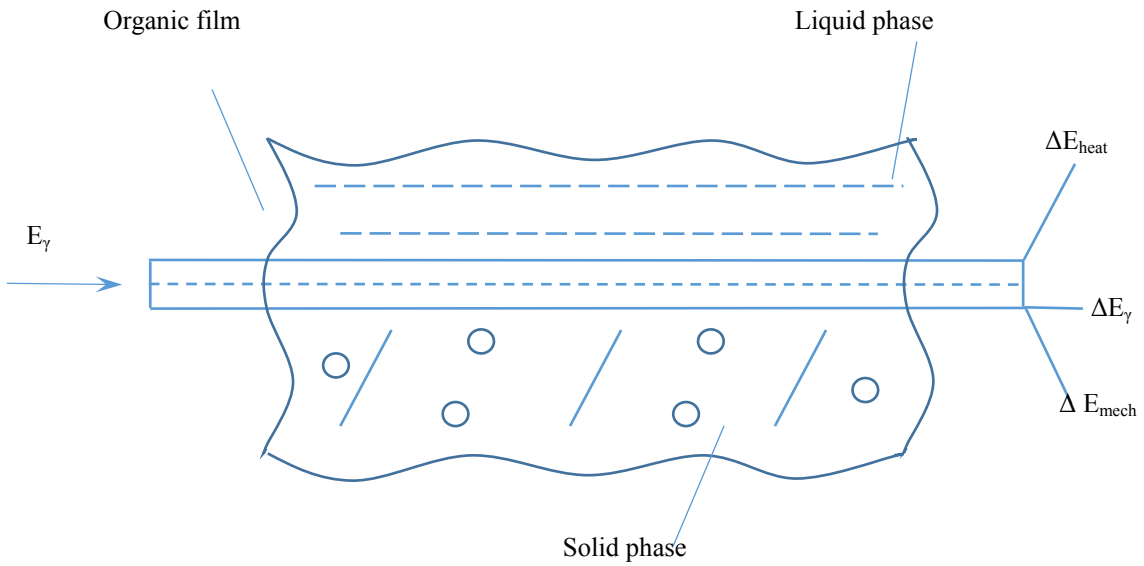
For each state of the phase boundary, the type of process it controls is defined, which are listed in response types.

In addition, methods for controlling the phase boundary were identified.

So according to the spatial attribute of the electronic level of consideration (horizontal row of the matrix), the types of response to external influence are exoemission, ionization and radiolysis. The driving force for the implementation of these processes is the intraphase disequilibrium that occurs when exposed, which can be controlled using 3 types of changes in the state of the film itself (the bottom row of the matrix). This can be done by low-energy methods such as:

- changes in the contact conditions of heterogeneous phases, for example, taking into account the effects of focusing;
- by changing the resonant parameter of one of the components of the boundary;
- the change in capacitive ratios separated by phase boundaries.

As an example, we consider the transforming potential of a film of an organic compound (HC) for the listed levels of consideration. Here, the types of external response are radiolysis, redox and polymerization-depolymerization reactions (vertical column for organic films). Here, at the electronic level of consideration, the frequency of external influence is within 109 ÷ 106 Hz. This means that intraphase nonequilibrium (activation of the boundary) can be accomplished with the help of electromagnetic or mechanical vibrations. In the specified frequency range, γ-rays, thermal oscillations, and ultrasonic waves have such capabilities.In the course of the resulting valuable reaction, they will ensure a change in concentration between the separated phases and within the film itself according to the scheme:



The scheme of film interactions (HC) at the phase boundary

Figure shows a diagram of the appearance of responses at the interface of a fluid-containing system under an external exposure on an organic film by the γ-radiation frequency. These high-frequency vibrations, passing through the film, are partially transformed under the influence of its structure and at the output we have:

$$E_\gamma \rightarrow E_{heat} + E_{mech} + E`_\gamma , \quad (1)$$

where E_γ – γ-radiation energy; ΔE_{heat} – energy of the IR spectrum of mechanical vibrations; $E`_\gamma$ – unabsorbed gamma rays energy.

Here it can be seen that as the scale of structural elements decreases during the response, new forms of external energy conversion from γ-radiation of the electromagnetic spectrum to mechanical vibrations of the thermal (IR) and ultrasonic (US) ranges appear. In the absence of resonance manifestations, these responses have a linear dependence on the frequency of conversion.

To do this, it is enough to know the space-time relations of the acting flow, which are interconnected with the speed υ by the universal linear relationship:

$$\upsilon = \lambda\nu, \quad (2)$$

where λ – the wavelength; ν – the frequency.

The response parameters depend on the speed properties of the perceiving medium and, depending on their nature, have linear and power relations [8]:

- for electromagnetic oscillations:

$$\upsilon = \frac{c}{n}; \quad (3)$$

- for mechanical waves in a solid (speed of sound):

$$\upsilon^2 = \frac{E}{\rho}; \ \upsilon^2 = \frac{G}{\rho}; \quad (4)$$

- speed of sound in liquids:

$$\upsilon_{ж}^2 = \frac{\sigma}{\rho}; \quad (5)$$

- surface wave velocity in fluid:

$$\upsilon_{П}^2 = gh , \quad (6)$$

here E is Young's modulus, ρ is density; G is the shear modulus; σ – surface tension.

The interaction mechanism in each case is determined by the speed parameters of the phases in contact with each other. Thus, the state of the phase boundary will change. Thus, by changing the state of the phase boundary (film), it is possible to control the response processes in the contacting media (in this example, at the boundary of the organic film).The quantitative ratios in the course of interaction obey A. P. Smirnovs law. [9].

The obtained experimental results on the study of the spectral parameters of the response to external influence showed a good convergence of the obtained data with a theoretical ratio.

To solve the problems of digitalization of technological processes, it is necessary to have knowledge of all types of external response for nano and macro levels of consideration. These responses should contain information that is distributed over spatial-temporal characteristics, each of which reflects the energy potential of the manifestation capabilities of a particular process depending on the scale of the structural elements and the frequency (temporal sign) of their oscillations around the equilibrium position.

For this case, a matrix table 2 of the matching of processes has been developed inherent in all types of reactions to external influences for four levels of consideration, differing from each other by three orders of magnitude:

- intraatomic;
- interatomic;
- intramolecular;
- intermolecular.

Table 2 – General view of the matching matrix for the selection of resonant conditions for the interaction of dissimilar substances

Reaction type / Level of consideration	Solid phase	Liquid phase (petrochemistry)	Gas phase (pyrolysis, polymerization)	Phase boundary (energy converters)
Intraatomic	Ionization potential, electron work function	Refractive index	Polarization	Atomic heat capacity electrode potential
Interatomic	Breaking energy, communication atmosphere	Dissociation energy	Sound speed	Electrodependence, sorption
Intramolecular	Molecular breaking energy	Specific heat, sound speed, density	Molar heat capacity	Thermal conductivity electrical conductivity
Intermolecular	Lattice parameter	Ion radius	Covalent radius, free path length	Diameter pairs, interfacial surface contact potential difference

Energy ratios are determined by the type of chemical reactions:

- solid phase;
- liquid phase
- gas-phase;
- phase boundary.

Thus, the developed correspondence matrix for selecting resonant interaction modes covers a wide range of phenomena inherent in all substances in different states. Practical use of such a matrix allows to:

- select the type of resonant interaction;
- determine catalytically - active substances;
- use the necessary scale features to achieve the conditions of multiplicity;
- harmonize the electrical and mechanical methods of converting external energy to obtain given properties.

After creating such matrices for nano and macro levels of consideration, it becomes possible to implement digitalization processes using the following algorithm:

- determination of the interaction mechanism at the phase boundary;
- identification of the level of consideration by frequency;
- identification of the level of consideration by spatial attribute;
- determination of the prevailing process;
- selection of a specific process control method.

According to the results of the analysis of the types of interaction at the phase boundary between the phases, the following conclusions:

1. The mechanisms of interaction at the phase boundary of the phases it separates depend on the space-time ratios of the boundary itself and the substance of the neighboring phases. The types of responses to external forcings are determined for three levels of consideration: electronic, crystallographic and structural (molecular).

2. As a response to an external effect, there are corresponding to each level types of disequilibrium: intraphase, concentration, and interphase. It provides the appearance of driving forces (transformation) of a specific response, the mechanisms of which are developed by mathematical and physical models.

3. It is shown that, depending on the type of film coating, there are 3 types of control processes during which the state of the phase boundary changes. Such methods are: changing contact conditions, resonant interaction mode and changing capacitive parameters of the contacting phases.

4.A mathematical equation is proposed to determine the quantitative parameters of the interaction with external influences for nano-levels of consideration.

5. An algorithm has been developed for the digitalization of all types of response to external influences according to space-time features.

Г. Ж. Молдабаева, Г. П. Метакса, Ж. Н. Алишева

Қ. И. Сатпаев ат. ҚазҰТЗУ, Алматы, Қазақстан

ТАБИҒИ ЖАҒДАЙ ШАРТТАРЫНДАҒЫ ТҰТҚЫРЛЫҚТЫ ТӨМЕНДЕТУ ПРОЦЕССТЕРІН ІСКЕ АСЫРУҒА АРНАЛҒАН ТЕОРИЯЛЫҚ НЕГІЗДЕР

Аннотация. Фазалардың бөліну шекарасында өзара болып жатқан шығу тегі әртүрлі пленкалар үшін, кеңістік-уақыт матрицасыәзірленді .Берілген қасиеттерді алу үшін фазалардаың бөліну шекарасынаәсер ету әдістері және басқарылатын процесстердің түрлері көрсетілген.

Түйін сөздер: бөліну шекарасы, мұнай, су, кварц, матрица, кеңістік-уақыт.

Г. Ж. Молдабаева, Г. П. Метакса, Ж. Н. Алишева

КазНИТУ им. К. И. Сатпаева, Алматы, Казахстан

ТЕОРЕТИЧЕСКИЕ ОСНОВЫ ДЛЯ РЕАЛИЗАЦИИ ПРОЦЕССОВ СНИЖЕНИЯ ВЯЗКОСТИ В УСЛОВИЯХ ПРИРОДНОГО ЗАЛЕГАНИЯ

Аннотация. Разработана пространственно-временная матрица взаимодействий, происходящих на границе раздела фаз для пленок разного происхождения. Показаны виды управляемых процессов и способы воздействия на границу раздела фаз для получения заданных свойств.

Ключевые слова: граница раздела, нефть, вода, кварц, матрица, пространство-время.

Information about authors:

Moldabayeva G. Zh., KazNTU named after K. I. Satpayev, Almaty, Kazakhstan; moldabayeva@gmail.com; https://orcid.org/0000-0001-8231-0560

Metaxa G. P., KazNTU named after K. I. Satpayev, Almaty, Kazakhstan; gmetaksa@mail.ru; https://orcid.org/0000-0001-5271-429X

Alisheva Zh. N., KazNTU named after K. I. Satpayev, Almaty, Kazakhstan; zhannat_86.2007@mail.ru; https://orcid.org/0000-0003-0929-4984

REFERENCES

[1] Lomonosov M.V. A Word on the Formation of Metals From Earth Tremors , September 6,1757. On the layers of the earth. M., 1949. 210 p.

[2] Kuhn T.S. The Essential Tension selected studies in scientific. 1977.

[3] Wood B.J., Gregory R.T., Crawford M.L., Newton R.S., Ridley J., Thompson A.B., Walter J.W., Ferry J.M., Hollister L.S ., Yardley B.U.D. Fluid rock interaction during metamorphism. WORLD. M., 1989. 249 p.

[4] Zakirov S.N., Zakirov E.S., Barenbaum A.A. Geosynthesis in the problem of the origin of oil and gas // Tr. VIII Int. Symp.: Advanced technology development, enhanced oil recovery and well studies. 2013. P. 43-46.

[5] Muslimov R.Kh., Glumov N.F., Plotnikova I.N. etc. Oil and gas fields are self-developing and constantly renewable objects. Geology of oil and gas. Special release. 2004. P. 43-49.

[6] Boyko G.I., Sarmurzina R.G., Karabalin U.S., Lyubchenko N.P., Shaikhutdinov E.M. Innovative technologies and new reagents for enhanced oil recovery, field processing of oil, destruction of highly stable oil sludge emulsions and minimization of environmental pressure on the environment // International Scientific and Practical Conference "Modern trends in higher education and science in the field of chemical and biochemical engineering" September 14. 2018, Almaty. P. 11-14.

[7] Metaxa G.P., Alisheva Zh.N. On the mechanism of synthesis of hydrocarbons (HC) at the interface of phases // Bulletin of the National Engineering academy of the Republic of Kazakhstan. N 2(64). P. 74-79.

[8] Yavorsky B.M., Detlaf A.A. Handbook of physics. M.: Science, 1974. P. 942.

[9] Smirnov A.P. General laws of the development of phase transitions // Blurry phase transitions. Riga: P. Stucka State University of Latvia, 1978. P. 3-28.

[10] Erfan Mohammadian, Radzuan Junin, Omeid Rahmani, Ahmad Kamal Idris. Effects of sonication radiation on oil recovery by ultrasonic waves stimulated water-flooding // Elsevier Ultrasonics. 53 (2013). P. 607-614.

[11] Augustine Agi, Radzuan Junin, Ramin Shirazi, Gbadamosi Afeez, Nurudeen. Comparative study of ultrasound assisted water and surfactant flooding // Journal of King Saud University – Engineering Sciences xxx (2018) xxx–xxx.

[13] Hossein Hamidi, Erfan Mohammadian, Radzuan Junin, Roozbeh Rafati, Mohammad Manan, Amin Azdarpour, Mundzir Junid. A technique for evaluating the oil/heavy-oil viscosity changes under ultrasound in a simulated porous medium // Elsevier Ultrasonics. 54 (2014). P. 655-662.

[14] Khosrow Naderi, Tayfun Babadagli. Influence of intensity and frequency of ultrasonic waves on capillary interaction and oil recovery from different rock types // Ultrasonics Sonochemistry. March 2010. Vol. 17, Issue 3. P. 500-508.

[15] Wang Zh. Research on ultrasonic excitation for the removal of drilling fluid plug, paraffin deposition plug, polymer plug and inorganic scale plug for near – well ultrasonic processing technology / Zh. Wanga, J. Zengb, H. Songc, F.Li // Procedia Chemistry. 2017. N 36. P. 162-167.

[16] Moldabayeva G.Zh., Metaxa G.P., Alisheva Zh.N. Scientific-technical basics of viscosity reduction of the Kazakhstani oils, which provide a significant increase of oil reservoirs // News of the National academy of sciences of the Republic of Kazakhstan. Series of geology and technical sciences. ISSN 2224-5278. 2018. Vol. 3, N 430. P. 186-194.

[17] Mullakaev M.S., Abramov V.O., Pechkov A.A. Ultrasonic unit for restoring oil wells // Chemical and Petroleum Engineering. 2009. Vol. 45. P. 133-137.

[18] Mullakaev M.S., Abramov O.V., Abramov V.O., Gradov O.M., PechkovA.A. An ultrasonic technology for productivity restoration in low-flow boreholes // Chemical and Petroleum Engineering. 2009. Vol. 45. P. 203-210.

[19 Shipulin A.V. Ispol'zovanie inercii massy skvazhinnoj zhidkosti pri vozdejstvii na plast // Neft'. Gaz. Novacii. 2009. N 2. P. 34-35.

[20] Xintong Huang, Cuihong Zhou, Quanyu Suo, Lanting Zhang, Shihan Wang. Experimental study on viscosity reduction for residual oil by ultrasonic, Elsevier Ultrasonics - Sonochemistry. 41 (2018). P. 661-669.

[21] Zamahaev V.S. Fizicheskie osnovy planirovanija impul'sno-volnovogo vozdejstvija na neftegazovye plasty // Nefteotdacha. 2002. N 5. P. 46-50.

[22] Zholtaev G.Zh., Iskaziev K.O., Abayıldanov B.K. Paleosoic deposits as option for reserves replacement & expansion of raw material base for petroleum industryin Mangyshlak // News of the National academy of sciences of the Republic of Kazakhstan. Series of geology and technical sciences. ISSN 2224-5278. 2018. Vol. 5, N 431. P. 163-171. https://doi.org/10.32014/2018.2518-170X.22

[23] Zhumagulov B.T., Masanov Zh.K., Azhikhanov N.T. Fluid filtration to multi-bore horizontal wells in a deformable porous medium // Bulletin of the National academy of sciences of the Republic of Kazakhstan. ISSN 1991-3494. 2019. Vol. 1, N 377. P. 14-20. https://doi.org/10.32014/2019.2518-1467.2

Publication Ethics and Publication Malpractice
in the journals of the National Academy of Sciences of the Republic of Kazakhstan

For information on Ethics in publishing and Ethical guidelines for journal publication see http://www.elsevier.com/publishingethics and http://www.elsevier.com/journal-authors/ethics.

Submission of an article to the National Academy of Sciences of the Republic of Kazakhstan implies that the described work has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see http://www.elsevier.com/postingpolicy), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The National Academy of Sciences of the Republic of Kazakhstan follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http://publicationethics.org/files/u2/New_Code.pdf). To verify originality, your article may be checked by the Cross Check originality detection service http://www.elsevier.com/editors/plagdetect.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the National Academy of Sciences of the Republic of Kazakhstan.

The Editorial Board of the National Academy of Sciences of the Republic of Kazakhstan will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

www:nauka-nanrk.kz

ISSN 2518-170X (Online), ISSN 2224-5278 (Print)

http://www.geolog-technical.kz/index.php/en/

Верстка *Д. Н. Калкабековой*

Подписано в печать 14.10.2019.
Формат 70x881/8. Бумага офсетная. Печать – ризограф.
15,0 п.л. Тираж 300. Заказ 5.

Национальная академия наук РК
050010, Алматы, ул. Шевченко 28, т. 272-13-19, 272-13-18