Список литературы / References

1. Brandt A.R. Converting oil shale to liquid fuels: energy inputs and greenhouse gas emissions of the Shell in situ conversion process // Environ. Sci. Technol., 2008. V. 42. P. 7489-7495.
2. Крейнин Е.В. Нетрадиционные углеводородные источники. Новые технологии их разработки. Монография. М.: Проспект, 2016. 208 с.
3. Van Meurs P., DeRouffiguan E.P., Vinegar H.J., Lucid M.F. Conductively heating a subterranean oil shale to create permeability and subsequently produce oil, 1989. U.S. Patent 4 886 118.
4. Kalmar Nicolas. In situ recovery oil from oil shale, 1984. U.S. Patent 4 444 258.
5. Passey Q.R., Thomas M.M., Bohacs K.M. Method for production of hydrocarbons from organic-rich rock, 2001. U.S. Patent 6 918 444.
6. Харрис К.К., Сэндберг Ч.Л., Винигар Х. Ограниченные по температуре нагреватели, применяемые для нагревания подземных пластов, 2008. Патент U.S. 011 007.
7. Фоулер Т.Д., Сэндберг Ч.Л., Шебер В., Винигар Х. Способ конверсии insitu с использованием нагревающей системы с замкнутым контуром, 2009. Патент U.S. 011 905.
8. Lopatin V.V., Martemyanov S.M., Bukharkin A.A., Koryashov I.A. Underground pyrolytic conversion of oil shale // Proceedings of the 8th international forum on strategic technology 2013 (IFOST2013). V. 1. P. 547-549. June 28 – july 1. Ulaanbaatar.
9. Knyazeva A.G., Maslov A.L., Martemyanov S.M. A two-phase model of shale pirolysis // Fuel, 2018. V. 228. P. 132-139.

SOLUBILITY IN THE SYSTEM SODIUM CHLORATE - RHODANIDE AMMONIUM – WATER

Kodirova D.T.¹, Tukhtayev S.², Nabijanov A.A.³

Email: Kodirova17136@scientifictext.ru

¹Kodirova Dilshodkhon Tulanovna - PhD in Technics, Associate Professor,
CHEMICAL TECHNOLOGY DEPARTMENT;

²Tukhtayev Saydakhral - Doctor of Technical Sciences, Academic, Academician of the Academy of
Sciences of the Republic of Uzbekistan, Head of Laboratory;

³Nabijanov Abdulaziz Abdukhamid ugli – Graduate Student,
CHEMICAL TECHNOLOGY DEPARTMENT,
FERGANA POLYTECHNIC INSTITUTE,
FERGANA, REPUBLIC OF UZBEKISTAN

Abstract: the article presents data on the solubility of the components in the sodium chlorate – ammonium rhodanide – water system, which was studied by the visual-polythermal method in the temperature range from (-29.9 ° C) to 80 ° C. The results of the study of sodium chlorate - ammonium rhodanide - water can be used for the production of rhodanite containing defoliants, as the article provides the ratios of components at which the salting out of ammonium rhodanide in aqueous medium in the presence of sodium chlorate occurs.

Keywords: heterogeneous phase equilibria, solubility diagram, defoliants, desiccants, crystallization.

РАСТВОРИМОСТЬ В СИСТЕМЕ ХЛОРАТ НАТРИЯ - РОДАНИД АММОНИЯ – ВОДА

Кодирова Д.Т.¹, Тухтаев С.², Набижанов А.А.³

¹Кодирова Дилишодхон Тулановна - кандидат технических наук, доцент, кафедра химической технологии;

²Тухтаев Сайдахрал - доктор технических наук, профессор, академик Академии наук Республики Узбекистан, заведующий лабораторией;

³Набижанов Абдулазиз Абухамид угли – студент магистратуры, кафедра химической технологии, Ферганский политехнический институт, г. Фергана, Республика Узбекистан

Аннотация: в статье приведены данные по растворимости компонентов в системе хлорат натрия - роданид аммония – вода, изученной визуально-политермическим методом в температурном интервале от -29,9 °C до 80 °C. Полученные результаты исследования хлорат натрия - роданид аммония - вода можно использовать для производства роданитов содержащих дефолиантов, так как в статье приводятся соотношения компонентов, при которых происходит минимальное высаливание роданида аммония в водной среде в присутствии хлората натрия.

Ключевые слова: гетерогенные фазовые равновесия, диаграмма растворимости, дефолианты, десиканты, кристаллизация.

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Sodium chlorate is one of the widespread defoliant - desiccants of inorganic origin [1]. The main disadvantages of it is the lack of efficiency and "rigidity" of the action on plants. The introduction of various nitrogen-containing compounds into sodium chlorate leads to an increase in the defoliating activity and a decrease in its negative effect on plants [2, 3].

In this regard, to clarify the behavior of sodium chlorate and ammonium rhodanide with their joint presence and substantiate the process of obtaining effective defoliant based on them, the solubility in the sodium chlorate – ammonium rhodanide – water system was studied by the visual-polythermal method [4].

For the study, sodium chlorate and ammonium rhodanide of qualification "h" were used, which were additionally purified by recrystallization from water.

The binary systems of ammonium rhodanide — water and sodium chlorate — water, have been studied by a number of authors [5, 6]. Our findings are in good agreement with the literature.

The sodium chlorate – ammonium rhodanide – water solubility system was studied using nine internal cuts: sections I – II were drawn from the side of sodium chlorate – water to the top of ammonium rhodanide, and III – IX from the side of ammonium rhodanide to water to the top of NaClO₃.

Based on the data of binary systems polytherm and internal sections, a polythermic solubility diagram of the NaClO₃-NH₄SCN-H₂O system from -29.9 (complete freezing of the system) to 800 °C (figure) is constructed, on which the crystallization fields of ice, chlorate and ammonium and sodium rohanide are separated. These fields converge at four nodal nonvariant points of the joint existence of three different solid phases, for which crystallization temperatures and compositions of the equilibrium solution are established.

Table 1. Double and triple nodal points of the system $\text{NaClO}_3\text{-NH}_4\text{SCN-H}_2\text{O}$

The composition of the liquid phase, %			Crystallization temperature, °C	Solid phase
NH_4SCN	NaClO_3	H_2O		
1	2	3	4	5
	42,0	52,1	-18,5	Ice + NaClO_3
3,4	41,2	55,4	-21,9	Ice + $\text{NaClO}_3 + \text{NH}_4\text{ClO}_3$
4,2	38,4	57,4	-20,4	Ice + NH_4ClO_3
7,0	29,6	63,4	-14,8	То же
15,8	15,6	68,6	-13,2	То же
17,1	10,8	72,1	-14,4	То же
42,2		57,8	-25,3	Ice + NH_4SCN
44	5,6	50,4	-29,9	Ice + $\text{NH}_4\text{SCN} + \text{NH}_4\text{ClO}_3$
53,6	8,4	62	23,6	$\text{NH}_4\text{SCN} + \text{NH}_4\text{ClO}_3$
54,5	9,2	36,3	26	Also
56,4	16	27,6	34	$\text{NH}_4\text{ClO}_3 + \text{NaSCN} + \text{NH}_4\text{SCN}$
60,4	14	25,6	37	$\text{NaSCN} + \text{NH}_4\text{SCN}$
74,3	6,8	18,9	52,4	Also
83,1	3,6	13,3	69,8	Also
56,4	17,5	26,1	35,6	$\text{NH}_4\text{ClO}_3 + \text{NaSCN}$
56,0	19,8	24,2	38,0	Also
55,8	21,2	23	39,2	$\text{NaClO}_3 + \text{NH}_4\text{ClO}_3 + \text{NaSCN}$
61,4	22,8	15,8	56,8	$\text{NaClO}_3 + \text{NaSCN}$
64,8	24,8	10,4	74,0	Also
5,8	41,7	52,5	-1,6	$\text{NaClO}_3 + \text{NH}_4\text{ClO}_3$
11,6	42,4	56	21,6	Also
24,5	38,8	36,7	49	Also
40,8	32,0	27,2	62,0	Also
51,0	27,2	21,8	54,0	Also
37,5	6,4	56,1	-25,2	Ice + NH_4ClO_3

As can be seen from the above data, in the studied system, ammonium chlorate and sodium rhodanide are formed as new phases.

The crystallization fields of the sodium and ammonium rhodanide salts occupy a smaller part of the polythermal diagram than the crystallization fields of sodium and ammonium chlorates. This indicates a good solubility in this system of sodium and ammonium rhodanides compared with their chlorates [7].

From the results of the study of the solubility of the components of the $\text{NaClO}_3\text{-NH}_4\text{SCN-H}_2\text{O}$ system, it follows that exchange reactions between the components of the system occur in an aqueous medium with the formation of ammonium chlorate and sodium rohanide. Therefore, it should be expected that the combined use of defoliation of sodium chlorate with ammonium rhodanide leads to an increase in the defoliating activity due to the formation of more active ammonium chlorates [8].

Fig. 1. Polythermic solubility diagram of the $\text{NaClO}_3\text{-NH}_4\text{SCN-H}_2\text{O}$ system

References / Список литературы

1. Zokirov T.S. Chemical defoliation and desiccation of cotton. Tashkent. Uzbekistan, 1968. Pp. 52-69.
2. Tukhtaev S., Shammassov R.E., Kucharov Kh., Musaev N.Yu. Physical and chemical study of sodium chlorate - carbamide - water system and the development of technology for the production of defoliants based on them. Tez. report XIII All-Union Scientific Conf. on TNV and mineral fertilizers. Gorky, 1985. C. 90.
3. Nabiyeu M.N., Kucharov Kh., Askarova M.N., Musaev N.Yu. Investigation of mutual water systems from chlorates, sodium sulfates, magnesium, ammonium and defoliants based on them, // VII All-Union Conference on Physico-Chemical Analysis. Frunze October 4-6, 1988 Frunze: Ilim, 1988. P. 188-189.
4. Trunin A.S., Petrova D.G. Visual-polythermal method / Kuibyshev Polytechnic Ins. Kuibyshev, 1977. 94 s.
5. Handbook of solubility. /From. ed. Kafarov V.V. M., L., Academy of Sciences of the USSR, 1961. T. 1. Kn. 1. 960 s.
6. Kirgintsev A.N., Trushnikova L.N., Lavrentyeva V.T. Solubility of inorganic substances in water. L.: Chemistry, 1972. C. 194-196.

7. Nabiev M.N., Danilov V.B., Kisilev A.V., Tukhtaev S. Cotton defoliants and desiccants. Series UDM. Tashkent: "Fan", 1987. 40 s.
8. Adylkhodzhaev A.I., Igamberdiev B.G., Umarova M.M. The use of rice straw to increase the strength characteristics of gypsum binders // Universum: Technical sciences: electron. scientific journals, 2018. № 10 (55). [Electronic resource]. URL: <http://universum.com/ru/tech/archive/item/6441/> (date of acces: 03.10.2019).

ПРОБЛЕМА ПРОЕКТИРОВАНИЯ И СТРОИТЕЛЬСТВА НИЗКОНАПОРНЫХ ГИДРОТЕХНИЧЕСКИХ СООРУЖЕНИЙ В СЛОЖНЫХ ИНЖЕНЕРНО-ГЕОЛОГИЧЕСКИХ УСЛОВИЯХ

Палуанов Д.Т. Email: Paluanov17136@scientifictext.ru

*Палуанов Данияр Танирбергенович - кандидат технических наук, доцент,
кафедра гидравлики и гидроэнергетики, энергетический факультет,
Ташкентский государственный технический университет им. Ислама Каримова,
г. Ташкент, Республика Узбекистан*

Аннотация: в статье рассматривается проектирование и строительство низконапорных гидротехнических сооружений в сложных инженерно-геологических условиях, условие проектирования основания гидротехнических сооружений, преимущество и проблема строительства данных сооружений, анализ построенных низконапорных сооружений на слабых грунтах и изучение технологии строительства основания, пример разрушения связан с основанием сооружений. Предложены рекомендации технологических приемов для строительства основания низконапорных гидротехнических сооружений.

Ключевые слова: низконапорные гидротехнические сооружения, основание, слабый грунт, вес сооружения, технология, полимерные материалы, проектирование, строительство, эксплуатация.

PROBLEM OF DESIGN AND CONSTRUCTION OF LOW-HEAD HYDRAULIC ENGINEERING CONSTRUCTIONS IN COMPLEX ENGINEERING-GEOLOGICAL CONDITIONS

Paluanov D.T.

*Paluanov Daniyar Tanirbergenovich - PhD in technical, Associate Professor,
HYDRAULICS AND HYDROPOWER DEPARTMENT, ENERGY FACULTY,
TASHKENT STATE TECHNICAL UNIVERSITY UNDER NAMED ISLAM KARIMOV,
TASHKENT, REPUBLIC OF UZBEKISTAN*

Abstract: the article discusses the design and construction of low-head hydraulic engineering constructions in complex engineering and geological conditions, the condition for designing the base of hydraulic engineering constructions, the advantage and problem of building these constructions, the analysis of low-head hydraulic engineering constructions built on weak soils and the study of the base construction technology, an example of destruction associated with the base constructions. Recommendations of technological methods for the construction of the base of low-head hydraulic engineering constructions are proposed.

Keywords: low-head hydraulic engineering constructions, base, weak ground, weight construction, technology, polymeric materials, designing, construction, field operation.

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