SOLUBILITY IN THE SYSTEM SODIUM CHLORATE - RHODANIDE SODIUM – WATER

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Abstract: *in the article the data on solubility of components in system sodium chlorate, sodium rhodanid the water investigated visually - by a polythermal method in a temperature interval from (-38,8 °C) with up to 80 °C are resulted with. The results of the study of sodium chlorate - sodium rhodanide - water can be used for the production of related threads, as well as components that ensure the interconnection of components at which sodium rhodanide is minimally leached into the aqueous medium in sodium chloride.*
Keywords: *heterogeneous phase balance, the diagram of solubility, defoliants, desicants, crystallization.*

РАСТВОРИМОСТЬ В СИСТЕМЕ ХЛОРАТ НАТРИЯ - РОДАНИД НАТРИЯ – ВОДА

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Аннотация: *в статье приведены данные по растворимости компонентов в системе хлорат натрия - роданид натрия – вода, изученные визуально-политермическим методом в температурном интервале от (-38,8°С) до 80 °С. Полученные результаты исследования хлорат натрия - роданид натрия - вода можно использовать для производства роданитсодержащих дефолиантов, так как в статье приводятся соотношения компонентов, при которых происходит минимальное высаливание роданида натрия в водной среде в присутствии хлората натрия.*
Ключевые слова: *гетерогенные фазовые равновесия, диаграмма растворимости, дефолианты, десиканты, кристаллизация.*

UDC 541.123.5

It is known that when two defoliants are used together, the lack of action of one component is compensated by the effect of the other, and thus the efficiency of defoliation increases [1, 2, 3]. Chlorate and rhodanide sodium are widespread defoliant - desicants of inorganic origin.

However, sodium chlorate itself has combustible explosive properties, and sodium rhodanid prevents the secondary growth of plants after defoliation.

In order to reduce the deficiency of sodium chlorate and use the positive properties of sodium rhodanid, as well as to determine the behavior of these components with their joint presence and substantiate the process of obtaining effective defoliants, the solubility in the $NaClO_3$-NaSCN-H_2O ternary system has been studied by the visual-thermal method.

Information about the solubility of the components in this system is missing in the literature.

Chlorate and sodium rhodanid of “h” qualification, purified by recrystallization from water, were used for the study.

Binary systems rhodanid sodium — water and sodium chlorate — water, have been studied by a number of authors [4]. Our findings are in good agreement with the literature.

The solubility in the sodium chlorate – sodium rhodanide – water system was studied using six internal cuts: I – V cuts were made from the sodium rhodanide side — water to the top of sodium chlorate, and VI — from the sodium chlorate side — water to the top of sodium rhodanide.

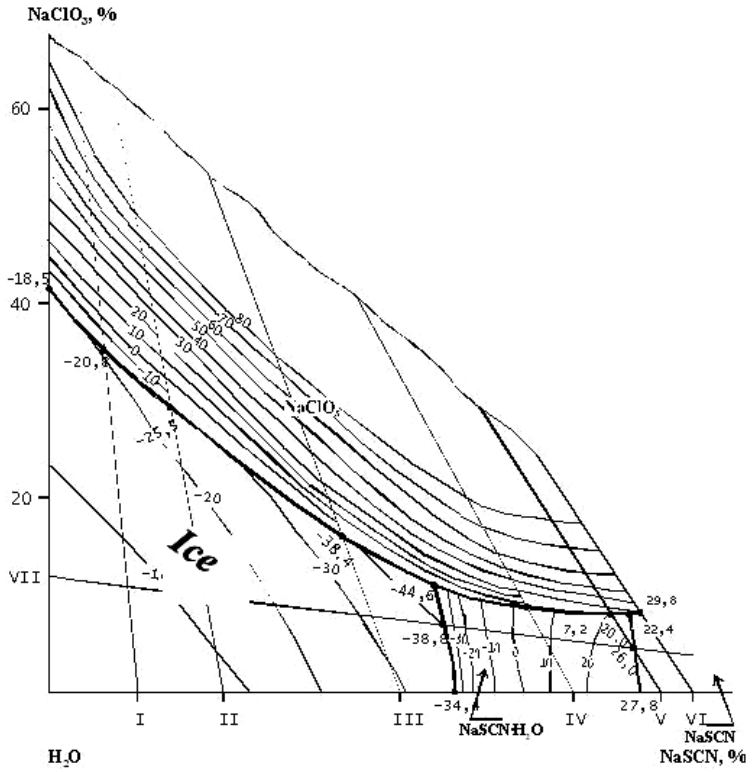

Fig. 1. Polythermic solubility diagram of sodium chlorate – sodium rhodanide – water system

Based on the data of polytherms of binary systems and internal cuts, a polythermic solubility diagram of the $NaClO_3$ –NaSCN – H_2O system from -38.8 ° C (complete solidification of the system) to 80 ° C was constructed, on which the fields of crystallization of ice, sodium chlorate, monohydrate and anhydrous sodium rohanide are separated. These fields converge at two triple 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).

Table 1. Double and triple points system $NaClO_3$-NaSCN-H_2O

№	The composition of the liquid phase, %			temperature, °C	Solid phase
	NaSCN	$NaClO_3$	H_2O		
1.	-	41,9	58,1	-18,5	Ice +$NaClO_3$
2.	6,1	34,9	59,0	-20,8	Also
3.	13,6	29,0	57,4	-25,5	Also
4.	32,0	15,6	52,4	-38,4	Also
5.	41,6	11,0	47,4	-44,6	Ice +$NaClO_3$+NaSCN·H_2O
6.	42,7	6,8	50,5	-38,8	Ice +NaSCN·H_2O
7.	44,2	-	55,8	-34,4	Also
8.	52,0	8,6	39,4	7,2	NaSCN ·H_2O+$NaClO_3$
9.	61,2	8,0	30,8	20,0	Also
10.	63,0	7,8	29,2	22,4	$NaClO_3$+NaSCN·H_2O+NaSCN
11.	63,6	4,4	32	26,0	NaSCN·H_2O+NaSCN
12.	64,2	-	35,8	27,8	Also
13.	64,5	8,2	27,3	29,2	$NaClO_3$+NaSCN

The research results show that in the studied temperature and concentration range, no new chemical compounds or solid solutions are formed in the system. The system is of a simple eutonic type [5].

A feature of solubility polytherm is that, due to the good solubility in this system, sodium rhodanide has a significant salting out effect on sodium chlorate, the crystallization field of which increases with increasing temperature.

At –10; 0; 10 and 20 ° C, the solubility of sodium chlorate in the presence of sodium rhodanide is reduced by 33.7; 36.4; 38.4 and 41.0% compared with its initial solubility in water. Sodium chlorate has little effect on the solubility of sodium rhodanide. With increasing temperature, the composition of etonic solutions of sodium chlorate - sodium rhodanide - water is significantly enriched with sodium rhodanide while reducing the content of sodium chlorate[6,7].

From the results of the study of sodium chlorate - sodium rhodanide - water follows the feasibility of obtaining defoliants in those ratios of components at which there is a minimal salting out of sodium rhodanide on sodium chlorate.

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