**NEW REUSABLE HIGH EFFICIENCY CATALYST OF HIGHLY CONCENTRATED HYDROGEN PEROXIDE DECOMPOSITION**

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***Keywords:*** *highly concentrated hydrogen peroxide, stabilizing, stainless steel, catalyst.*

The results of the development and properties study of high-performance reusable solid catalyst for decomposition of highly concentrated hydrogen peroxide without the use of noble metals with long-term stable performance and long service life are presented.

The total operating time of the catalyst package is more than 3,500 seconds, while no catalyst activity reduction and no traces of destruction have been found.

Experimental results have shown stable results of the main parameters in all test modes of the studies (reactor pressure, temperature, entrainment, etc.), which allows to conclude that there is no destruction of the catalyst and no loss of its properties. This confirms the prospects of using the developed catalyst as a reusable decomposition catalyst “ПВ-85” and “ПВ-98”.

Thorough elaboration of a technology and full-scale production of a new solid catalyst require broad-scale research and tests.

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**Background and current process solutions for initial separation stage of methylchlorosilane direct synthesis products**

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***Keywords****: methylchlorosilanes, methyl chloride, direct synthesis, synthesis off-gases, distillation, absorption.*

The historical succession and continuous development of methylchlorosilanes direct process by GNIIChTEOS researchers allow obtaining new technological solutions considering scientific and operating experience accumulated at GNIIChTEOS. The paper deals with a brief history of initial separation process of methylchlorosilane direct synthesis products. The latest achievements of GNIIChTEOS in respect of development and commercial implementation of the process allowing efficient separation of methylchlorosilane direct process products without additional power consumption are described in details. The new process provides stable production of raw methylchlorosilanes with lower content of methyl chloride, unreacted methyl chloride with low methylchlorosilanes content and process off-gases purification from methyl chloride. The technology is the result of the comprehensive approach to the considered process. While preparing the paper we used unpublished internal materials of GNIIChTEOS.

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**Organogermanium compounds. Synthesis, development and application prospects**

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***Keywords:*** *hydrogermylation, vinylsilanes, hydrogermanes, dielementethanes, silylolefins, dichlorogermylene.*

Methylchlorovinylsilanes hydrogermylation by methylchlorohydrogermanes and trichlorogermane etherate is studied. The effect of chlorine atoms and methyl groups number at silicon and germanium in the starting agents on the yield and composition of the obtained adducts is determined. The influence of silyl groups in starting silylolefin molecules on the investigated process is analyzed. The presence of the second silyl substituents is found to decrease the reactivity of silyl substituted ethylene in these reactions. On the contrary, at hydrogermylation by trichlorogermane etherate the presence of the second silyl group in an unsaturated compound molecule significantly increases the product yield. Reactions of halogen replacement to a germyl group in 1,2-dihalogenethanes by means of the latter interaction with available trichlorogermane complexes – dichlorogermylene etherate, aminate, phosphate and dioxanate were studied. It is found that dichlorogermylene dioxanate complex demonstrates the highest reactivity in these reactions. Quantum-chemical calculations of the studied reactions were performed.

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**Chemistry and technology of organo-lead and organotin compounds in GNIIChTEOS**

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**Key words:** lead tetraethyl, antiknock agent for gasolines, organotin compounds, PVC stabilizers, catalysts, bioactive compounds, silylmethylstannanes, synthesis, technology, main researchers.

The author considers works of GNIIChTEOS researchers in chemistry and technology of tetraethyl lead (1930-1991) and organotin compounds (late 50s – up to present). Organomagnesium method in direct synthesis of organotin compounds and their processing technique are demonstrated, organogalogen stannanes in particular. The following issues are looked upon: efficient continuous organomagnesium method for tributylchlorostannanes synthesis; linear and cyclic silylmethylchlorostannanes process allowing the production of organotin compounds on their base with improved application characteristics. The names of principal investigators who made significant contribution to the research are listed.

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**Basic advances in synthesis of ceramics forming organoelement oligomers**

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***Keywords:*** *oligomers, polycarbosilanes, nanometalcarbosilanes, organoalumoxanes, organoalumoxanesiloxanes, organotitaniumoxane alumoxanesiloxanes, organoyttriumoxanealumoxanes, organoyttriumoxanealumoxanesiloxanes, oxides, carbides.*

The paper deals with advances of SSC RF GNIIChTEOS in the area of competitive products synthesis – ceramics forming organoelement oligomers (polymers), that are representatives of high-tech chemical compounds and are indispensable for the development on their basis of new components for high-impact high-temperature and oxidation resistant nanoceramic composites, namely: ceramic fibers, matrixes, combined protective and barrier coatings, refractory powders. Researchers of SSC RF GNIIChTEOS have developed and patented high-performance synthesis methods of ceramics forming organoelement oligomers (polymers), - oligo(poly)carbosilanes and nanometalcarbosilanes – silicon carbide ceramic precursors, as well as elementoxane oligomers – organoalumoxanes, organoalumoxanesiloxanes, organotitaniumoxane siloxanes, organotitaniumoxane alumoxanesiloxanes, organoyttriumoxane alumoxanesiloxanes – precursors for high quality oxide ceramics of corundum, alumosilicate (mullite), alumotitaniumsilicate, alumoyttrium (garnet) and yttriumalumosilicate compositions.

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