

**SOFT SHELLS IN AIR FLOW:
EXPERIMENTS AND COMPUTATIONAL MODELS
Part I**

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ABSTRACT

The purpose of this work is creation a computational model of a pneumatic shell in an air flow supposing its spatial deformation due to the formation of fold areas and changes in the shell volume. Existing methods of calculation of a stress-strain state (SSS) recommended by current standards, the theory of thin-walled, membrane (soft) shells, the technical theory of shells, including the use of non-linear material characteristics are based on the classical mechanic's hypotheses. These methods are suitable for calculating shells of constant shape and volume at small strains. For the first time on the basis of experimental studies and the theory of open systems (interactions of "body-medium"), the method for calculating SSS of the soft shell in the air flow is proposed. It is shown that such a computational model to the greatest extent corresponds to the real behavior of the "body" - the soft shell in the "medium" - the air flow and the internal pressure.

INSTALLATION FOR SEPARATION OF POLYOLS AND METAL FORMATES

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ABSTRACT

This article is devoted to the description of the development of a technological installation designed to implement an improved method for the separation of polyols, for example, neopentylglycol or trimethylolpropane (etriol), and sodium or calcium formates. The process developed involves adding an organic solvent to the mixture of substances to be separated. In this case, the polyhydric alcohol is dissolved, and sodium or calcium formate crystallizes. The separation of sodium formate or calcium from a solution of a polyhydric alcohol in an organic solvent is carried out by filtration. The organic solvent used is recycled. Then the solution is cooled and the polyol is crystallized. As an organic solvent, an aromatic solvent is used, for example, toluene. An organic solvent is added to the mixture of substances to be separated and the mixture is heated to boiling point. At the same time, the mixture is dehydrated. After distillation of the water, the organic solvent is recycled. Next, carry out the crystallization of sodium formate or calcium, insoluble in an organic solvent, and the dissolution of the polyol. The developed method allows for increasing the yield of well-purified target products. To implement it, simple and reliable installation for the separation of polyhydric alcohols, sodium formate or calcium formate has been proposed.

APPLICATION OF METHODS OF STATISTICAL THERMODYNAMICS FOR MODELING EQUILIBRIUM IN POLYFUNCTIONAL ION-EXCHANGERS

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ABSTRACT

In the framework of the polyfunctional ion exchanger model, the isotherm equation for the ion exchange of singly charged ions is proposed. This equation describes the ion exchange on the ion exchanger, characterized by a specific distribution function of exchange centers in the exchange constant. The ways of constructing the distribution function of exchange centers according to potentiometric titration are proposed. For proton donor centers, the sorption isotherm is:

$$E_{Me^+} = \int_0^{\infty} \frac{F(K)}{\left(1 + \frac{a_{H^+}}{a_{Me^+}K}\right)} dK$$

where: E_{Me^+} - experimentally determined degree of saturation of active centers; $F(K)$ - the distribution function of active centers in the ion exchange constant; a_{H^+} and a_{Me^+} - the activity of the corresponding ions H^+ and Me^+ ; K - ion exchange constant. For proton-acceptor centers, the sorption isotherm equation is similar.

ALGORITHMIZATION OF UNSTRUCTURED WEB ARRAYS AND ESTIMATION OF ITS EFFICIENCY

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ABSTRACT

The article discusses the question of optimizing the algorithm for the operation of unstructured web arrays and answers the question of which algorithm is best for achieving high performance. It also gives an answer to how much you can optimize the operation of arrays on the web and on a local machine.