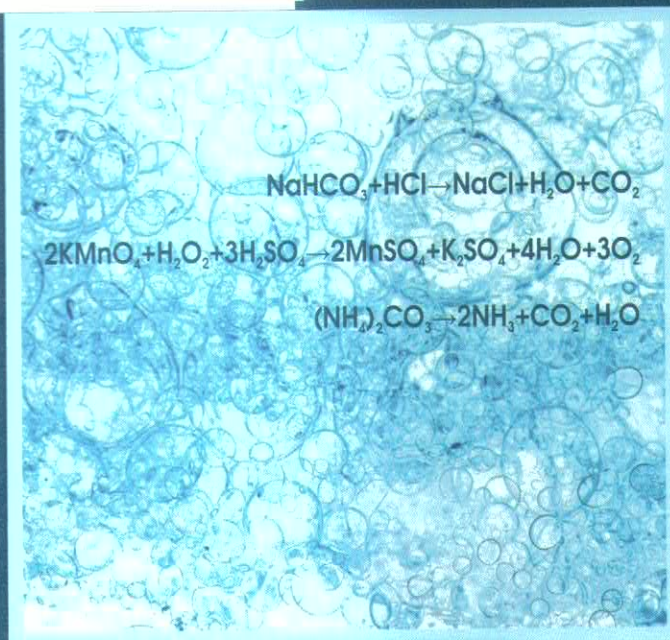


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PHYSICAL CHEMISTRY OF FOAMS AND AEROSOLS

Educational manual



Almaty 2016

UDC 544.77.051.13

O-83

*Recommended for the Academic Council
of the Faculty of Chemistry and Chemical Technology
and Editorial and Publishing Council at Farabi KazNU
(protocol №1 dated 02.11.2016)*

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Candidate chemical sciences, assistant professor

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Ospanova Zh.B.

O-83 Physical chemistry of foams and aerosols; educational manual / Zh.B. Ospanova, K.B. Musabekov. – Almaty: Qazaq university, 2016. – 72 p.
ISBN 978-601-04-2100-4

The educational manual consists of a theoretical part and an experimental part. The manual presents the laboratory works with a brief theoretical introduction and control questions for self work.

The purpose of manual – to teach students to experimental methods of obtaining of foam and aerosol systems and study of their properties.

Designed for university students studying in the field «Chemistry», «Chemical technology of organic substances» and «Chemical technology of inorganic substances».

Учебное пособие состоит из теоретической и экспериментальной частей. В пособие представлены лабораторные работы с кратким теоретическим введением и контрольные вопросы для самопроверки.

Цель данного пособия – научить студентов экспериментальным методам получения пенных и аэрозольных систем и исследования их свойств.

Разработано для студентов высших учебных заведений, обучающихся по специальностям «Химия», «Химическая технология органических веществ» и «Химическая технология неорганических веществ».

UDC 544.77.051.13

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ISBN 978-601-04-2100-4

INTRODUCTION

Foams are dispersion of gas in a liquid or solid body; aerosols are disperse systems consisting of liquid or solid particles of a substance suspended in a gaseous atmosphere (usually in air).

Such disperse systems are quite abundant in nature and engineering. Foamed and aerosol detergents are widely used for cleaning bath, carpets and furniture. Of great importance are foams in fire-fighting, especially, against ignition of tanks with easily inflammable liquids, when extinguishing fire in closed spaces – basements, vessels, airplanes. Foams are used for heat insulation, for example, to prevent freezing of fields for open-cast mining of minerals. Foams with solid thin walls (aerogels) are widely used for production of heat insulation and sound-proofing materials, foam plastics, rescue facilities, etc. Confectionaries, cakes refer to solid foams, too.

Particles of aerosols get into the atmosphere from the Earth in a ready form, but a significant part of them is formed due chemical reactions between gaseous, liquid and solid substances, including steam. A great amount of aerosols is formed as a result of natural processes, and some of them have an anthropogenic origin. The amount of particles released to the atmosphere due to the activity of man is approximately equal to 1 billion tons a year. The chemical composition of the particles is different; it is silicon dioxide – sand, toxic metals, pesticides, hydrocarbons and others. The main source of anthropogenic aerosols is the process of combustion. The power industry and transport release 2/3 of the total amount of anthropogenic aerosols. Among other sources of aerosols are metallurgical plants, production of construction materials, chemical industry.

The properties of foam and aerosol systems are significantly influenced by processes taking place at the interface disperse phase – disperse medium. Therefore, the knowledge of the properties of systems characterized by the presence of phase boundary, and the ability to control their behavior are of both practical and scientific importance.

Educational issue

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**PHYSICAL CHEMISTRY
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AEROSOLS**

Educational manual

Editor *A.R. Izbasarova*
Typesetting and
cover design *G.Sh. Kaliyeva*

Cover design used photos from sites
www.4423407-background-of-blue-bubbles-foam.com

IB №10213

Signed for publishing 02.12.2016. Format 60x84 1/2. Offset paper.
Digital printing. Volume 4.5 printer's sheet. 100 copies. Order №5544.
Publishing house «Qazaq university»
Al-Farabi Kazakh National University
KazNU, 71 Al-Farabi, 050040, Almaty

Printed in the printing office of the «Kazakh University» publishing house