

NAZHIPKYZY MERUYERT

Candidate of Chemical Sciences, Acting Associate Professor of the Chair of Chemical Physics and Materials Science al-Farabi Kazakh National University.

She is the author of more than 75 works, including 7 textbook, 4 tutorials, 2 electronic textbooks. She is a holder of scholarships of the President of the Republic of Kazakhstan «Bolashak» (2012). She holds a state scientific scholarship for talented young scientists (2016). She is a holder of titles «The best teacher of the University-2016». She passed internship at universities: Reading (Great Britain, 2012), Sardar Patel (India, 2013), Surrey (Great Britain, 2015), Waseda (Japan, 2017).

M. Nazhipkyzy is a member of the editorial board of journals «Universal Journal of Applied Science», «Eurasian Chemico-Technological Journal», «Advances in Materials Chemistry».

M. Nazhipkyzy

MODERN PROBLEMS OF PROCESSES BURNING, DETONATION, EXPLOSION

Educational manual

A1-FARABI KAZAKH NATIONAL UNIVERSITY

M. Nazhipkyzy

MODERN PROBLEMS OF PROCESSES BURNING, DETONATION, EXPLOSION

Educational manual

Almaty «Qazaq university» 2017

UDC 662 (075.8) LBC 35.51 x 73 N 32

Recommended for publication by the decision of the Academic Council of the Faculty of Chemistry and Chemical Technology, Editorial and Publishing Council of Al-Farabi Kazakh National University (Protocol №5 dated 11.07.2017); Educational and methodical association on groups of specialties «Natural sciences», «Engineering and technology» of Republican educational-methodical council on basis Al-Farabi Kazakh National University (Protocol №2 dated 29.06.2017)

Reviewers:

Doctor of chemical sciences, Professor *R.A. Kazova* Doctor of chemical sciences, Professor *I.S. Irgibaeva* Doctor of chemical sciences, Professor *M.K. Aldabergenov*

Nazhipkyzy M.

N 32 Modern problems of processes burning, detonation, explosion: educational manual / M. Nazhipkyzy. – Almaty: Qazaq university, 2017. – 134 p. ISBN 978-601-04-2795-2

The educational manual is devoted to the problems of soot formation and fullerenes in the flame of hydrocarbons. The results on the synthesis of superhydrophobic soot in the combustion of hydrocarbons and the production of waterproofing materials based on it are presented, and materials on the use of soot as a waterproof combustible additive in ammonia-nitrate explosives are also presented.

The educational manual can be recommended not only to PhD doctoral students of the speciality 6D073400 – Chemical Technology of Explosives and Pyrotechnics, but also to undergraduates, PhD doctoral students of other training profiles, in addition, specialists mastering this field.

Published in authorial release.

UDC 662 (075.8) LBC 35.51 я 73

ISBN 978-601-04-2795-2

© Nazhipkyzy M., 2017 © Al-Farabi KazNU, 2017

CONTENT

UNCWERCH

1. FORMATION OF FULLERENES C60 IN HYDROCARBON	
FLAMES	7
1.1. The main allotropic modifications of carbon	7
1.2. The mechanism of formation of soot particles and fullerenes	
particles in a flame	10
1.3. The methods of synthesis of fullerenes in flames	
1.4. The influence of external local impact on the processes	
of formation of combustion products	
1.5. The influence rendered by a local effect of external acetylene –	
oxygen flame on temperature profile benzene – oxygen flame	
1.6. The effect of local action of external acetylene – oxygen flame	
on the mass yield of fullerene C_{60} during combustion of benzene –	
oxygen mixture.	
1.7. The influence of an external impact on the processes of	
formation of fullerenes nuclei	
2. FORMATION OF THE SUPERHYDROPHOBIC SOOTY	
SURFACE IN THE FLAME	
2.1. Hydrophobic and hydrophilic properties of materials	
2.2. Modeling of the wetting angle for liquid which is in contact	
with a rough surface	
2.3. Synthesis of hydrophobic soot in a flame	
2.4. Synthesis of hydrophobic soot in a flame under the effect	
of an electric field	91
2.5. Electron microscopic studies of hydrophobic soot samples	
obtained in the flame	
2.6. Investigations on the interaction of surface-active substances	
with the obtained hydrophobic soot surface.	
2.7. Application of hydrophobic soot in textiles	
2.8. Application of hydrophobic soot in the construction industry	
2:9 The use of nanoparticles in power systems of exlusive	
2.10. The use of hydrophobic soot in the ammonia-saltpeter	
explosive	
BIBLIOGRAPHIC LIST	124

BIBLIOGRAPHIC LIST	
References	

3

Provide a desired and experimental statements and st statements and statements

Educational issue

Meruyert Nazhipkyzy

MODERN PROBLEMS OF PROCESSES BURNING, DETONATION, EXPLOSION

Educational manual

Typesetting and cover design *G. Kaliyeva*

IB №11143

Signed for publishing 03.08.2017. Format 60x84 ¹/₁₆. Offset paper. Digital printing. Volume 8,37 printer's sheet. 500 copies. Order №4249. Publishing house «Qazaq university» Al-Farabi Kazakh National University KazNU, 71 Al-Farabi, 050040, Almaty

Printed in the printing office of the «Qazaq university» publishing house.