

Nanomaterials for Security

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Nanomaterials for Security

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Springer

Published in Cooperation with NATO Emerging Security Challenges Division

Proceedings of the NATO Advanced Research Workshop on
Nanomaterials for Security
Odessa, Ukraine
August 30–September 3, 2015

Library of Congress Control Number: 2016946179

ISBN 978-94-017-7594-6 (PB)
ISBN 978-94-017-7591-5 (HB)
ISBN 978-94-017-7593-9 (e-book)
DOI 10.1007/978-94-017-7593-9

Published by Springer,
P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

www.springer.com

Printed on acid-free paper

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Preface

These proceedings of the NATO-ARW “Nanomaterials for Security” held at the “Londonskaya” Hotel, Odessa, Ukraine, from August 30–September 3, 2015, emerged as a result of many presentations and discussions between workshop participants.

The Odessa workshop focused on several open problems including the current state of nanomaterials and security problems.

Recent advances in nanoscience have demonstrated that fundamentally new physical phenomena arise when systems are reduced in size down to dimensions comparable with the fundamental microscopic length scales of investigated materials. There have been many significant advances in the past two years since the last workshop, and some entirely new directions of research in these fields have been undertaken. The programme of the workshop allowed presentations and opened discussions on several emerging modern research topics, such as new nanomaterials and sensors. Theoretical advances were tested against major experimental and technological achievements in related materials. There was intensive discussion in the field of nanotechnologies and safety systems that include nanosensors, nanocomposite multifunctional coatings for safety systems, bio-nanosensors, and nanoanalyzers. In the session on nanomaterials, the physical properties of graphene, carbon nanotubes, new composite materials, and spintronics were presented. Latest developments in nanotechnology and measurement techniques facilitate the detection of explosives. The most promising new materials and experimental techniques for the detection of hazardous materials including explosives are carbon nanotubes, Josephson junctions, and NMR techniques. Participants benefitted from presentations of new methods for the detection of CBRN agents using chemical and biochemical sensors. The contemporary open problems of the physics of sensors include the determination of sizes of nanoparticles, identification of particles, and determination of concentration and mobility of nanoparticles.

We are grateful to members of the International Advisory Committee for their consistent help and suggestions, in particular to Prof. F. Peeters. We are grateful to the Nobel Laureate Prof. Klaus von Klitzing for a high level of scientific talk.

We would like to thank the NATO Science Committee for the essential financial support, without which the meeting could not have taken place. We also acknowledge the National Academy of Science of Ukraine, J. Stefan Institute, Ljubljana, and Faculty of Mathematics and Physics, University of Ljubljana, Slovenia, for their generous support.

Ljubljana, Slovenia
Kiev, Ukraine
February 2016

Janez Bonča
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Nobel Laureate K. von Klitzing and co-directors J. Bonča and S. Kruchinin

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