Cluster Deposition and Implantation on/in Graphite

Popok, Vladimir

Published in:
Graphite: Properties, Occurrences and Uses

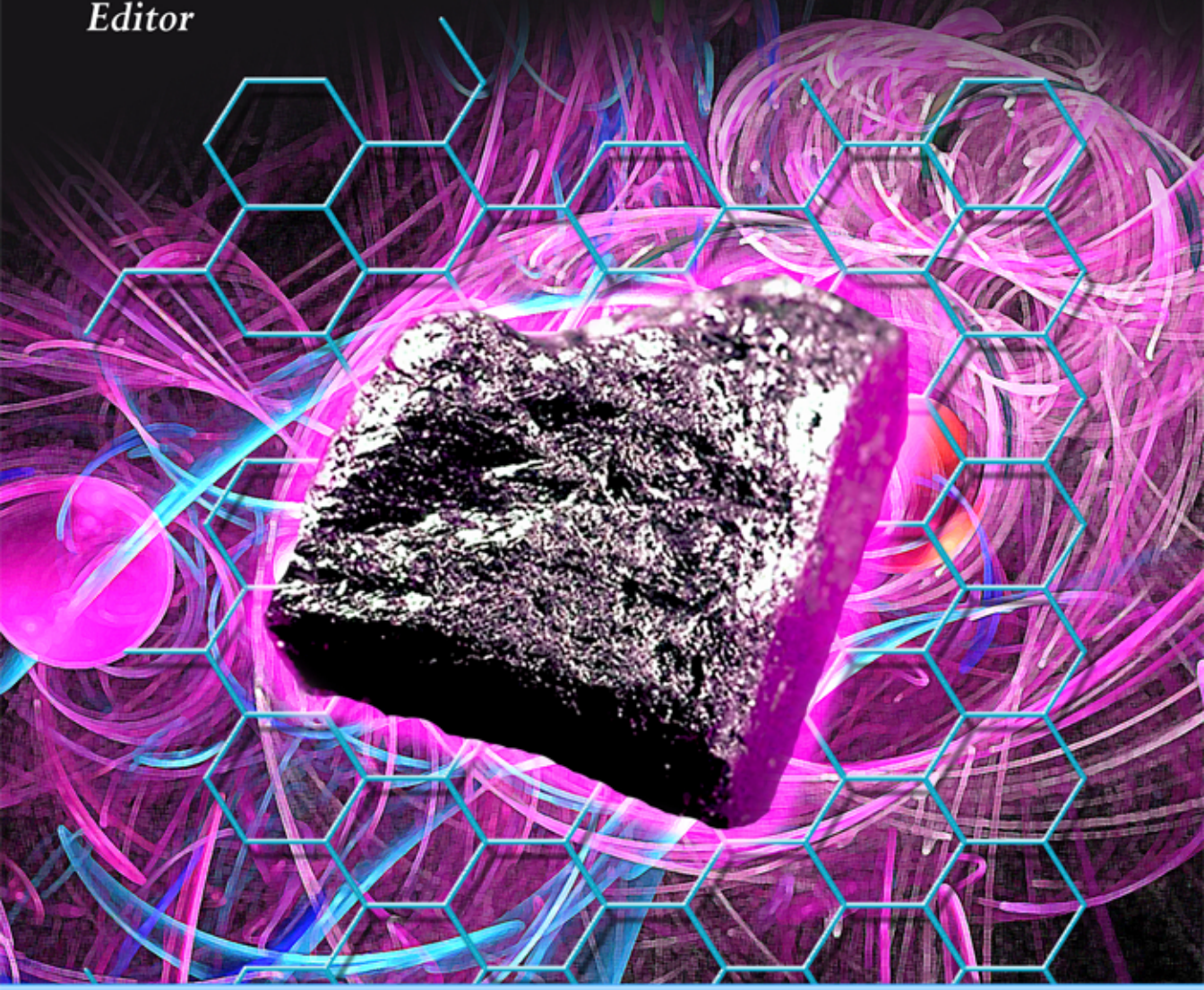
Publication date:
2013

Document Version
Publisher's PDF, also known as Version of record

GRAPHITE

Properties, Occurrences and Uses

Quinton C. Campbell
Editor



GEOLOGY AND MINERALOGY RESEARCH DEVELOPMENTS

NOVA

GEOLOGY AND MINERALOGY RESEARCH DEVELOPMENTS

GRAPHITE

PROPERTIES, OCCURRENCES AND USES

QUINTON C. CAMPBELL
EDITOR

nova publishers
New York

Library of Congress Cataloging-in-Publication Data

Graphite properties, occurrences and uses / editor, Quinton C. Campbell.
p. cm.
Includes index.
ISBN: 978-1-62618-577-7 (eBook)
1. Graphite. I. Campbell, Quinton C., 1951-
TA455.G7G74 2013
662'.92--dc23

2013010955

Published by Nova Science Publishers, Inc. † New York

CONTENTS

In: Graphite
Editor: Quinton C. Campbell
ISBN: 978-1-62618-576-0

Chapter 8

CLUSTER DEPOSITION AND IMPLANTATION ON/IN GRAPHITE

Vladimir N. Popok*
Department of Physics and Nanotechnology, Aalborg University,
Aalborg, Denmark

ABSTRACT

Cluster ion beam technique is a versatile tool which can be used for controllable formation of nanosize objects on a surface as well as modification and processing of surfaces and shallow layers on an atomic scale. In this chapter an overview of research on cluster interaction with graphite is presented. One of the emphases is put on pinning of metal clusters on graphite with a possibility of following selective etching of graphene layers. The other main topic of concern is related to the phenomenon of cluster stopping and the development of scaling law for cluster implantation in graphite. Graphite is chosen for experiments because it is a good model material; it has an atomically smooth surface that makes it easy to resolve very small deposited clusters or damaged areas. Layered structure of graphite with strong covalent bonds in the graphene sheets and very week van der Waals interactions between them is an interesting type of crystalline arrangement for modelling of clusters implantation. Additionally, there is rapidly increasing research activities on graphene which promises a number of applications in nanoelectronics, plasmonics, sensing etc. Therefore, understanding of particle behaviour on soft landing or pinning on graphene is of considerable practical importance.

INTRODUCTION

Ion-beam treatment of materials is one of very widely applied techniques for numeruous research and industrial purposes. Along with traditional monomer ions, atomic or molecular clusters (aggregates of atoms or molecules) have attracted considerable attention during the last two decades [1-6]. A cluster can be formed from atoms of the same chemical element or

* E-mail: vp@nano.aau.dk.