

Recent Advances in Diamond Science and Technology

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NICLEY, Shannon; NESLADEK, Milos & POBEDINSKAS, Paulius (2016) Recent Advances in Diamond Science and Technology. In: PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE, 213(10), p. 2550-2550.

DOI: 10.1002/pssa.201670669

Handle: <http://hdl.handle.net/1942/22645>



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Reference (Published version):

Nicley, Shannon S.; Nesladek, Milos & Pobedinskas, Paulius(2016) Recent Advances in Diamond Science and Technology Preface. In: PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE, 213(10), p. 2550-2550

DOI: 10.1002/pssa.201670669

Handle: <http://hdl.handle.net/1942/23078>

Preface

Recent Advances in Diamond Science and Technology

We are pleased to present this Topical Section highlighting recent progress from the diamond scientific community. The 20 papers presented here reflect the diversity of topics of current inquiry in this field. The diamonds in these studies span orders of magnitude in size, from nanodiamond surface functionalization studies up to large-scale single crystal diamond substrates for radiation detection. The results presented in this Topical Section also extend from fundamental studies on synthesis up to the realization of application specific devices. The breadth of these topics presents an interesting look at the current state of diamond research.

The Feature Article, by Nobu Naka and co-workers, highlights the importance of understanding the fundamental transport properties of photoexcited diamond [1]. The detailed description of the mechanisms presented represents the state-of-the-art in the understanding of these phenomena in diamond. The realization of improved future optoelectronic devices in diamond relies on this knowledge, and its successful implementation.

We are also pleased to highlight the back-cover article by Margarita Lesik and co-workers, which presents a promising fabrication method for future scalable and efficient quantum devices [2]. The diamond NV centre is a key application for diamond, and an expanding and high impact area of current research.

The articles presented here have been grouped into four broad categories, of diamond synthesis, colour centres & defects, devices, and surfaces. These fields each form their own sub community within the broader field; however they are all interrelated by the interesting challenges and outstanding potential of diamond.

We hope that this Topical Section on “Recent Advances in Diamond Science and Technology” will give insight into the latest achievements of diamond research, while providing motivation to take the next step in your own work.

Hasselt, September 30, 2016

Guest Editors

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- [1] N. Naka, H. Morimoto, and I. Akimoto, Phys. Status Solidi A **213**(10), 2551–2563 (2016), this issue.
- [2] M. Lesik, N. Raatz, A. Tallaire, P. Spinicelli, R. John, J. Achard, A. Gicquel, V. Jacques, J.-F. Roch, J. Meijer, and S. Pezzagna, Phys. Status Solidi A **213**(10), 2594–2600 (2016), this issue.