

Preface to Special Topic: Defects in Semiconductors

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Preface to Special Topic: Defects in Semiconductors

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We are pleased to deliver this Special Topic Section on Defects in Semiconductors. The papers included in this Section include the highlights of the 29th International Conference on Defects in Semiconductors (ICDS-2017), which was held in Matsue, Japan, from July 31 to August 4, 2017, and also more recent developments that were not presented in the conference.

Semiconductors in their pure forms are hardly employed in applications. Silicon chip fabrication, for example, goes through doping of silicon crystals by group III or V elements followed by fabrication of transistors through source/drain counter doping, gate insulator fabrication, metallization, etc. While dopant “impurities” are introduced intentionally to add functionality, a variety of fabrication steps also introduce unwanted defects that can degrade the performance of devices. Therefore, fundamental studies of defects in semiconductors are important for the enhancement of functionalities and for identification and elimination of unwanted defects.

New semiconductor materials are also emerging. In response, the range of topics of the recent ICDS and its related fields is expanding as readers can see in this Special Topic Section. The area of interest now spans from physics of defects and impurities in semiconductors, physics and application of technologically functional defects and impurities, nanotechnology and materials science for activation of technologically functional defects and impurities, single-defect physics for quantum information processing, impurities and defects to control electrical, optical, thermal, and magnetic properties of semiconductors, theoretical approaches to reveal the properties of defects, defects in emerging semiconductors such as new oxides, organic semiconductors, low-dimensional structures, graphene and other 2D materials, new developments in deposition methods and characterization tools for defect and impurity engineering, etc. We thank all the committee members of ICDS-2017 and all the contributors of the scientific papers in this very Special Topic Section.