

Francisco J. Arregui (Ed.): Sensors based on nanostructured materials

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Bibliography

Sensors based on nanostructured materials
Francisco J. Arregui (Ed.)
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Book's topic The development of nanostructured materials has opened the door to new and real applications for sensing in many different areas. This book provides an interesting overview of a wide variety of sensors based on nanostructured materials. The book contains an introductory chapter to the field and nine chapters covering different types of sensors based on nanostructured materials.

Contents The book starts by providing some data on nanotechnology and briefly describing the organization of the chapters. Each chapter contains an interesting introduction to the specific topic, followed by the different fabrication methods of nanostructured materials for sensing in the

particular field and, finally, the sensing applications already described in the literature of these devices. The sensing applications covered in the nine chapters are very varied, including temperature, pressure, strain, flow, magnetic fields, volatile organic compounds, ions, DNA, glucose, immunoassays, enzymes, cell detection and imaging.

Through Chaps. 2–4, carbon nanotube and fullerene sensors, non-carbon nanotubes (in particular, titania arrays), nanowires, nanocombs, nanobelts, nanorods, nanoswords and nanosquids of mainly ZnO and SnO are among the nanostructured materials whose applications in sensing are described. Chapter 5 deals with sensors at the nanoscale, being the chapter mostly focussed on the use of metal oxides and semiconductors in nanosensors.

The application of quantum dots for sensing is nicely reviewed in Chap. 6. In this chapter, an introduction to quantum technology and properties is first given. Then, synthesis of quantum dots and functionalization is described. Finally, a complete overview of sensing applications is provided: as ion indicators for in vitro biological applications (immunoassays, DNA detection, cell detection) and for in vivo applications (both nonselective and targeted imaging).

The book dedicates a chapter (Chap. 7) to nanostructured magnetic sensors. Encapsulated optical probes (i.e. molecules or multimolecular cocktails encased within a protective package) for chemical and biochemical sensing and optical fibre sensors based on nanostructured coatings are treated in Chaps. 8 and 9, respectively. The last chapter describes the production of nanocomposite materials (in particular, Metal Rubber™) and their use for mechanical strain sensing.

Comparison with existing literature Among the literature related to nanostructured materials for sensing, there are

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reviews related to specific types of sensors, but a textbook providing a comprehensive overview of the efforts and the successes in this field was a need successfully fulfilled by this book. Scientists working on particular nanostructured materials for sensing can use this book to get ideas from the various chapters offering complementary information.

Critical assessment Though the chapters are very different in length, they have similar structures, thus making easier the reading of the whole book. Each chapter has been written by well-acknowledged contributors. The book provides a good introduction to the fabrication of nanostructured materials for sensing and a comprehensive overview of their applications for sensing purposes of various physical, chemical and biological parameters.

Readership recommendation The book deals with fabrication of nanostructures and also with applications. It is very easy to read and contains didactic introductions to each chapter. Therefore, this book can be recommended to anyone who wants to have an overall picture of the symbiosis between nanoscience and sensing: students, technical personnel and scientists working in many different fields (those oriented to synthesis of nanostructures and those willing to use these nanostructures in many different sensing applications).

Summary *Sensors based on nanostructured materials* provides a good insight into the world of sensing with nanostructured materials. It provides a nice overview of fundamental principles, fabrication processes of the sensing devices and applications.

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