

Dear readers,

This manuscript originates from the different contributions presented in the Scientific Meeting of the Materials Institute throughout its first 10 years of existence. The Materials Institute (“Instituto Universitario de Materiales de Alicante” (IUMA)) organizes a scientific meeting each year (Scientific Meeting of the IUMA) with the objective of gathering outstanding researchers in the field of Materials Science in Spain, and get to know and discuss on the main research guidelines in this field. In the year 2014 these meetings reached their tenth edition with an international perspective.

The book content is organized in five sections which represent current strategic research sectors in the field of Materials Science: Materials for Energy Applications, Nanomaterials, Materials Modeling, Catalysis, Functional Materials and Biomaterials. The thirty-six contributions presented here, distributed in these five relevant areas in the field of materials science make this book a suitable consultation manual, which will allow knowing in depth both physical and chemical aspects of different materials, as well as processes for their application.

We are deeply satisfied with the resulting book because of the dedication of the different speakers and the quality of their presentations, and also because of the positive evaluation expressed by the researchers who have taken part in these Scientific Meetings. The successful development of the mentioned Meetings owes to the effort of the group heads and the administrative and technical staff of the University Materials Institute during these 10 years, especially Victoria Gómez and Javier Medina, who were always willing to solve any problems which have arisen throughout this period of time. Likewise, we wish to acknowledge the participation and effort of all those who have made the publishing of this book possible.

Finally we cannot forget all those senior researchers who are not currently in active service, but who were firmly and decidedly involved in establishing and strengthening the foundations of what today is the IUMA, both in its conception and organization of the different editions of the Institute

Scientific Meetings. This work thus serves as homage and tribute to their effort and dedication throughout their extensive research career.

November 2014

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Materials Institute

On behalf of the University of Alicante, it is an honor for me, as a Rector, to write the prologue of this book written to commemorate the tenth anniversary of the creation of the Institute of Materials of this University.

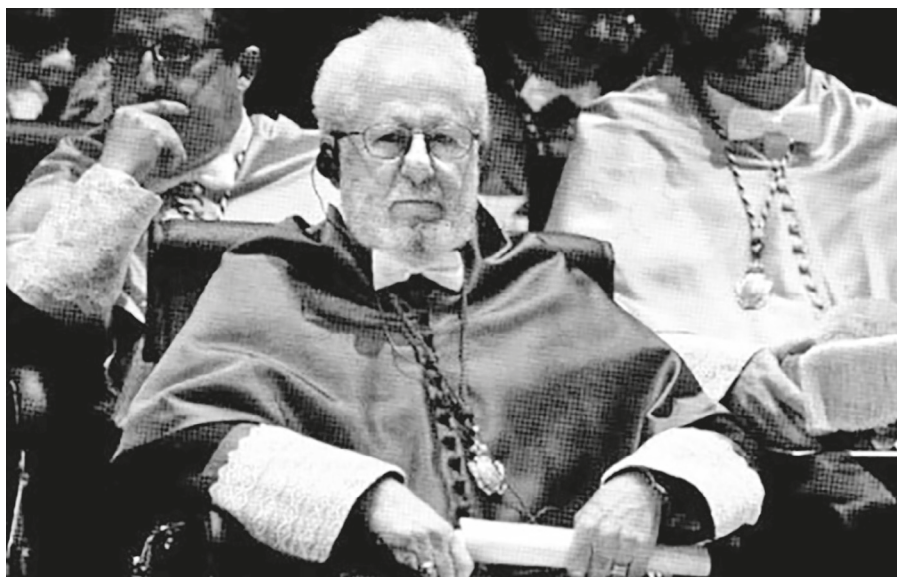
The institute was established in 2004 based on the previous collaboration of leading groups in the field of Chemistry and Materials Science from the University of Alicante. The starting point was a multidisciplinary Ph.D program created 15 years before, in which researchers from three different departments (physical chemistry, inorganic chemistry and applied physics) were participating. From that point, the Institute has sustained a steady growth and now gathers 42 scientists from five different departments. In all these years, they have devoted a great effort to expand their knowledge, transferring it to society and to train future scientist through Master and Ph.D. courses. It is one of the most important institutes of our University, which carries out relevant and high impact research.

Using the figures of year 2013, we can realize the importance of their research. They have published over a hundred articles in high-impact international journals, 12 Ph.D. theses have been defended and they rank among the most competitive institutes of the University for external research funding. Moreover, several scientists of this institute appear among the best Spanish academics and they are leaders in this field worldwide.

With this data, it is hardly surprising that the University of Alicante is proud of the creation and consolidation of the Materials Institute. The whole University congratulates the scientists pertaining to the Institute for their work, which has not only contributed to their own prestige institute but also to that of the University of Alicante.

*Manuel Palomar Sanz*

Rector of the University of Alicante



## THE NOBEL PRIZE ALAN J. HEEGER AT THE IUMA

In 2007, the IUMA had the pleasure to receive the Nobel Prize winner Prof. Alan J. Heeger, who participated in the III Scientific Meeting of the Materials Institute of Alicante where he gave a key note presentation on “Plastic Electronics and Optoelectronics”. Prof. Heeger was invited by Prof. María Díaz from the Applied Physics Department of the University of Alicante, who was a former postdoc researcher of the Nobel laureate at the University of California in Santa Barbara. Prof. Heeger also received a Doctor Honoris Causa degree by the University of Alicante.

Prof. Heeger was awarded the Nobel Prize in Chemistry in the year 2000, together with Alan J. MacDiarmid and Hideki Shirakawa “for the discovery and development of conductive polymers”<sup>1</sup>. These three brilliant scientists realized a way to increase the conductivity of a polymer a billion times, turning a material that is a good insulator into a conductor. This discovery has given rise to incredible applications, such as organic LEDs (light-emitting diodes), which are now used in some mobile phone screens, among other applications. Prof. Heeger has more than 800 publications in high impact scientific journals and more than 50 patents, and he is the co-founder of several companies. Alan J. Heeger is a Professor at the University of California in Santa Barbara and continues contributing to the field of metallic polymers as well as biosensor detectors.

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1. [http://www.nobelprize.org/nobel\\_prizes/chemistry/laureates/2000](http://www.nobelprize.org/nobel_prizes/chemistry/laureates/2000)