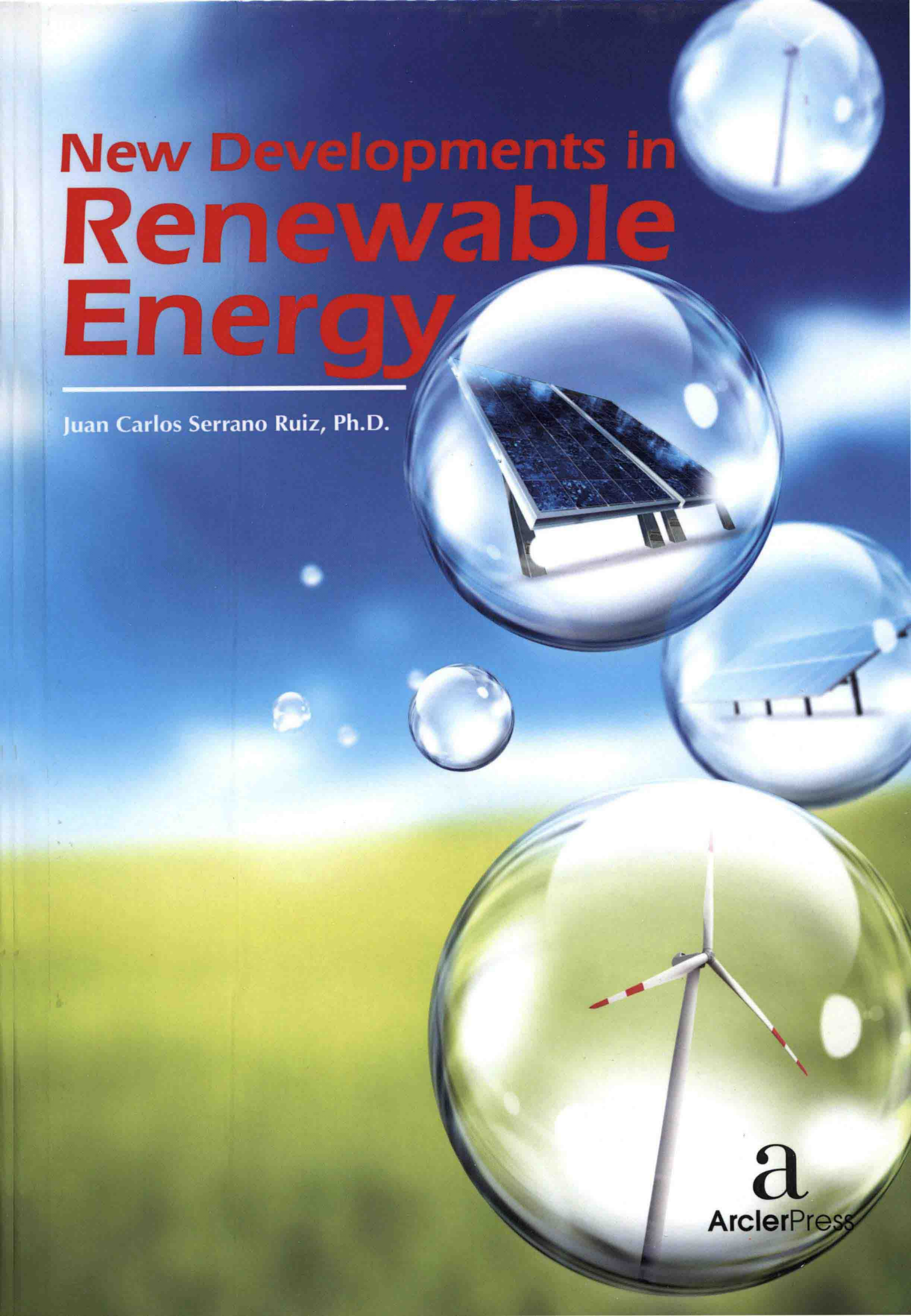
New Developments in Renewable Energy

Juan Carlos Serrano Ruiz, Ph.D.



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About the Editor

Juan Carlos Serrano Ruiz, Ph.D

Dr. Juan Carlos Serrano-Ruiz, graduated in Chemistry (University of Granada, Spain, 2001) and PhD in Catalysis and Materials Science (University of Alicante, Spain, 2006). In 2007 he moved to Madrid to for a post-doc position at the Spanish National Council of Research (CSIC) and in 2008 he was awarded a 2 years Fulbright-MEC fellowship to conduct studies on catalytic biomass conversion to fuels and chemicals in Professor James Dumesic's research group at the University of Wisconsin-Madison (USA). Dr. Serrano-Ruiz is co-author of about 60 papers in SCI journals including one in Science (considered one of the 30 biggest chemical breakthroughs of the year according to Chemistry World), 5 book chapters, and a good number of high-impact reviews (Energy and Environmental Science, Chemical Society Reviews, Annual Reviews) on catalytic biomass conversion. Dr. Juan Carlos Serrano has an h index of 25 and accumulates nearly 3000 citations (90 % of them within the last 5 years). Since 2012, he works as a Senior Researcher at Abengoa Research, the R&D branch of the multinational company Abengoa developing technologies for advanced biofuels production via catalytic conversion of biomass, among other projects.

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Preface

This century will definitively witness the replacement of current fossil fuels (i.e., oil, natural gas, and coal) with renewable energy sources. Currently, fossil fuels account for almost 80 % of the total energy consumed worldwide and, consequently, there is still a long way to walk before this replacement comes true. Renewable energy-based technologies are being improved fast and they are, little by little, reducing the development level gap with the well-known and optimized fossil technologies. This book offers a compendium of works describing these efforts on some of the most representative renewable technologies. The first five chapters are dedicated to biomass, the only renewable source of organic carbon available on Earth and thus, the only sustainable source for fuels and chemicals. Hydrogen is considered by many as the energy vector of the future. While the hydrogen technologies are in their infancy (as stressed in Chapter 6), there has been a tremendous progress in the last years on renewable hydrogen production and storage. Chapter 7 reviews the current state of one of the most interesting technologies for hydrogen production to date: photocatalytic water splitting. Photovoltaic technologies (Chapters 8 and 9), able to directly convert sunlight into electricity, are extremely important and have reached a high level of development. The discontinuous nature of renewable energies obligates to develop efficient storage systems (Chapters 10–12) such that the energy can be used when most required. Finally, Chapters 13 and 14 summarizes the current state of the electricity generating and tidal power technologies.

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