

Preface

The renewable energy sector has been the focus of worldwide effort to find sustainable and environmental friendly technologies for continuously increasing energy demands at low costs. However, our modern day energy requirements continued to be relied on the use of fossil-based sources. Among solar, wind, hydropower, biomass, biofuel and geothermal technologies, solar is the major one, because of its huge abundance compared to the current energy needs. A solar flux in a second (i.e. 1.74×10^5 TW) is more than sufficient to provide all the energy needs, required by current world population in a year. However, we need efficient and affordable technologies to harvest the solar radiation. Current technologies are facing various challenges to cut down cost/kWh, a clear progress trends exist in developing cutting-edge and higher efficient solar cells, as an alternative renewable energy source. Like all other fields, nano-science and technology is indeed becoming a prime factor in recent renewable energy research. In the present contest, we do not have any standalone renewable energy generation and utilization system. Renewable energy generation, storage and utilization is a multidisciplinary sector and development in each sector is equally important for its successful implementation.

Contributors of this book have extensive experience at various facets of renewable energy including materials chemistry, polymer physics, device fabrication, and nanotechnology. The book has fourteen high quality articles covering general aspects of renewable energy, regional policies, thin film solar cells, solar thermal, hydrogen production, energy conversion and storage. This book is a result of collaborations between all contributing authors who agreed to share their research expertise as well as visions for the future technologies. We would like to express our gratitude to all the authors, publishers, and other research groups for granting us the copyright permissions to use their illustrations. Although every effort has been made to obtain the copyright permissions from the respective owners to include citation with the reproduced materials, we would like to offer our sincere apologies to any copyright holder if unknowingly their right is being infringed. All the editors are indebted to the directors of Centre of Research Excellence in Renewable Energy (past and present) at King Fahd University of Petroleum & Minerals, Saudi Arabia for their continuous support. Finally, we would like to acknowledge the sincere support of Mr. Thomas Wohlbier of TTP publishing Authority, in evolving this book into its final shape.

Sincerely,

*Amir Al-Ahmed
Mohammad Kamal Hossain
Mohammad Afzaal
Haitham M. Bahaidarah*

Centre of Research Excellence in Renewable Energy
King Fahd University of Petroleum & Minerals, Saudi Arabia.