

## Preface

This Special Topic Volume is a result from the contribution of thirty-six experts from the international scientific community in the area of Photocatalysis. It comprehensively covers the application of photocatalytic materials for degradation of organic pollutant, pesticides, and solar energy conversion in order to have clean environmental and alternative source of energy such as hydrogen. This volume provides the latest and in-depth coverage to photocatalytic nanomaterials, nano-composites materials for the environmental and energy application. Although, the development of photocatalytic materials has been highly attracted to the researchers and many are trying to focus on the synthesis of new photocatalytic materials which can be applicable for the environmental cleanup and energy generation, still the output is laying under the expectation.

Recently some study demonstrated the various photocatalytic materials activity for photocatalytic degradation of the organic pollutant under irradiation of both visible and ultraviolet energy efficient light emitting diodes at low concentration and developed various kinds of photocatalytic reactors. Additionally, development of photocatalytic materials to utilize the solar light has also had been done in last few decades. However, still the efforts are in progress to develop new materials for effective and cost-effective, and reliable process for the environmental cleanup and hydrogen generation. Presently, many researchers are working on synthesis and modifications of photocatalytic materials to utilize the solar light for environmental cleanup and hydrogen production. Here in this volume development of visible light active photocatalytic materials like  $\text{TiO}_2$  and non- $\text{TiO}_2$  for various applications have been covered some extent.

This volume is indeed the result of the remarkable cooperation of many distinguished experts, who came together to contribute their research work and comprehensive, in-depth and up to date review chapters. I am very thankful to all contributing authors who, in spite of their busy life in research and teaching, willingly accepted the call to contribute and sent their manuscript in time. I would also like to express my gratitude to all the publishers and authors and others for granting us the copyright permissions to use their illustrations. Although sincere efforts were made to obtain the copyright permissions from the respective owners to include the citation with the reproduced materials, I would like to offer my honest apologies to any copyright holder if unknowingly, their right is being infringed.

This volume contains twelve state-of-the-art research articles and reviews. These reviews are focused on the application of nanostructured photocatalyst for  $\text{CO}_2$  reduction, solar energy conversion, photocatalytic degradation of organic pollutants and pesticides, high temperature stable anatase  $\text{TiO}_2$  photocatalysts, and recent development in the field of fabrication of photocatalytic micro-rectors. The research article selected for this volume focused on the synthesis and characterization of various photocatalytic materials such as doped  $\text{TiO}_2$ , Anatase  $\text{TiO}_2$  nanotube, Doped tungsten oxide, and composites like copper/ $\text{TiO}_2$ , and tantalum/ $\text{TiO}_2$  exploring their photocatalytic activity for the degradation of pollutants present in water under irradiation of solar, ultraviolet light and light emitting diode irradiation.

I would like to take this opportunity to express my sincere gratitude to Dr. H. C. Bajaj (Chief Scientist, CSMCRI, Bhavnagar). I would like to acknowledge the sincere efforts of Mrs. Anne-Kristin Wohlbier and Dr. Andrey Lunev of TTP publishing Authority, in evolving this Special Topic Volume into its final shape. Last but not the least I am highly appreciative of the support of my all family members.

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