INORGANIC METAL OXIDE NANOCRYSTAL PHOTOCATALYSTS FOR SOLAR FUEL GENERATION FROM WATER

Series: Springer Theses | Troy K Townsend (2014) | 71 pages

Nominated as an outstanding PhD thesis by the University of California, USA, this thesis gives a detailed introduction to photocatalysis. It includes over 40 illustrations and provides detailed experimental protocols. Townsend’s thesis explores the structure, energetics, and activities of three inorganic nanocrystal photocatalysts. The goal of this work is to investigate the potential of metal oxide nanocrystals for photocatalytic water splitting, which can one day provide us with clean hydrogen fuel derived from water and solar energy. Townsend’s work addresses the effects of co-catalyst addition to niobium oxide nanotubes for photocatalytic water reduction to hydrogen, and the use of iron oxide ‘rust’ in nanocrystal suspensions for oxygen production. Townsend studies a nickel/oxide-strontium titanate nanocomposite, which is a nanoscale water-splitting photocatalyst. He also examines the charge transport for this system. This book brings relevance to the design of inorganic nanomaterials for photocatalytic water splitting while introducing new directions for solar energy conversion.

ADVANCED RENEWABLE ENERGY SYSTEMS (2 VOL. SET)

Author: S C Bhatia | Publisher: Woodhead Publishing (2014) | 775 pages

Renewable energy is a natural energy having unlimited supply, as it can be used again and again and will never run out. It is derived from natural processes that are replenished constantly. In its various forms, it derives energy directly from the sun, or from heat generated deep within the earth. Included in the definition is electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources. This book is a complete treatise on renewable energy sources and also includes issues relating to biofuels. It aims to serve as a text for undergraduate and postgraduate students in relevant disciplines and a reference book for all professionals in related fields.

RENEWABLES IN FUTURE POWER SYSTEMS: IMPLICATIONS OF TECHNOLOGICAL LEARNING AND UNCERTAINTY

Series: Green Energy and Technology | Fabian Wagner (2014) | 291 pages

The book examines the future deployment of renewable power from a normative point of view. It identifies properties characterizing the cost-optimal transition towards a renewable power system and analyses the key drivers behind this transition. Special attention is paid to technological cost reductions and the implications of uncertainty. From a methodological perspective, the main contributions of this book relate to the field of endogenous learning and uncertainty in optimizing energy system models. The primary objective here is closing the gap between the strand of literature covering renewable potential analyses on one side and energy system modelling with endogenous technological change on the other side. The models applied in this book demonstrate that fundamental changes must occur to transform today’s power sector into a more sustainable one. This book also provides practically relevant insights on the long-term competitiveness of renewable power generation.