

NANO TOOLS AND DEVICES FOR ENHANCED RENEWABLE ENERGY

Edited by
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Micro & Nano Technologies Series

Nano Tools and Devices for Enhanced Renewable Energy

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Elsevier

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The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, United Kingdom
50 Hampshire Street, 5th Floor, Cambridge, MA 02139, United States

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British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

A catalog record for this book is available from the Library of Congress

ISBN: 978-0-12-821709-2

For Information on all Elsevier publications
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Publisher: Matthew Deans
Acquisitions Editor: Sabrina Webber
Editorial Project Manager: John Leonard
Production Project Manager: Manju Thirumalaivasan
Cover Designer: Greg Harris

Typeset by MPS Limited, Chennai, India



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Describing nanoclusters as the way forward for hydrogen economy using Pd nanoclusters as a base

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6.1 Introduction

Identifying and developing a sustainable energy system is a critical issue for global energy research as energy consumption per unit capita is one of the indexes for measuring economic development [1–5]. In line with the expansion of the world economy, the energy requirements of the nations are also growing at a fast rate. To meet our energy demand, we are extensively using fossil fuels, which are depleting at a fast rate and have a considerable negative environmental impact due to harmful greenhouse gas emissions, environmental pollutants, etc. In fact, the two major global concerns currently are fast depleting fossil fuels and climate change [1–5]. Currently, oil is the largest primary fuel, wherein it has a share of more than one-third of the global primary energy mix. So, oil accounts for more than 95% of the world's energy demand in the transport sector. Unfortunately, the combustion of hydrocarbon fuels for transportation and heating contributes over half of all greenhouse gas emissions and a large fraction of air pollutant emissions. Similarly, the production of electricity by using coal has precisely the same effect on the environment. Table 6.1 shows a comparison of different energy resources leading to life cycle emissions. It can be observed that fossil fuels, like coal and petroleum products, the maximally used energy sources around the world, have maximum global warming potential.