

Preface

The energy shortage and environment deterioration are fundamental challenges for humanity in this century. Therefore, creating the next generation of highly efficient energy production and storage technologies is becoming crucially important. Among the sustainable energy options, fuel cells convert the chemical energy of a fuel directly into electrical energy with high efficiency and low emission of pollutants, while advanced lithium batteries are an ideal choice for energy storage. The studies of fuel cells and lithium batteries are interdisciplinary in nature. For this reason, improvements in performance, durability, and lifetime of both fuel cells and batteries require not only a clear grasp of electrochemistry but also a better understanding of coupled mechanics and thermophysics behaviors in cells. This special issue, consisting of eight experimental and modeling articles contributed by world leading researchers, is to provide *Recent Progress in Mechanics and Thermophysics Research in Fuel Cells and Batteries*. The contributed articles feature original and review studies at the interface between electrochemistry and mechanics applied to batteries and fuel cells, advances in area of engineering design for lithium ion batteries, and works in the area of multi-physics and multi-scale

modeling of novel fuel cell systems. We hope that the papers presented in this special issue will act as a stimulus for initiating new ideas and projects on a broad range of multidisciplinary research topics in the traditional fields of mechanics, electrochemistry, engineering design, and thermophysics. We are confident that the collected works will contribute to form a new interdisciplinary research field that addresses mechanical and thermophysical issues related to the development of advanced electrochemical energy systems, including fuel cells and batteries.

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Francesco Ciucci and T. S. Zhao
The Hong Kong University of Science &
Technology, Hong Kong, China

F. Ciucci (✉) · T. S. Zhao

The Hong Kong University of Science & Technology,
Hong Kong, China

e-mail: mefrank@ust.hk