Contents

1 Introduction ........................................ 1
Mei-Hung Chiu

Part I Overview of Science Education in Asia

2 Science Education Research in Mainland China .............. 17
Lei Wang, Yujun Zhu, Yanxia Jiang, Rui Wei, Yao Zhou,
Yuying Guo, Xin Wei, Wenyuan Yang and Enshan Liu

3 Science Education Research and Practice in Lebanon:
Current Status, Challenges, and Future Prospects ........... 41
Saouma BouJaoude and Fadi El-Hage

4 School Science Teaching and Learning in Macau: Problems
and Challenges ........................................... 55
Bing Wei

5 Science Education Research and Practice in Malaysia ....... 71
Lilia Halim and T. Subahan Mohd Meerah

6 Historical Overview of Mongolian Science Education
Development .............................................. 95
Oyuntsetseg Nookoo

7 Commentary: Developments and Reforms in Science
Education for Improving the Quality of Teaching
and Research ........................................... 119
David Treagust and Chi-Yan Tsui

8 Science Education Research in Oman: Opportunities, Trends,
and Challenges ........................................ 129
Sulaiman M. Al-Balushi
9 Singapore Science Education ........................................ 155
   Kim Chwee Daniel Tan, Tang Wee Teo and Chew-Leng Poon

10 Opportunities and Challenges for Science Education in Asia:
   Perspectives Based on the Taiwan Experience ................ 175
   Chorng-Jee Guo and Mei-Hung Chiu

11 Science Education in Thailand: Moving Through Crisis
to Opportunity ......................................................... 197
   Chatree Faikhamta and Luecha Ladachart

12 Commentary: What We Can Learn from Science Education
   in Asian Countries? ................................................. 215
   Jari Lavonen

Part II Content Analysis of Science Education Research

13 Impacts of Citations on Conceptual Change Articles
   Between 1982 and 2011: From International and Regional
   Perspectives ......................................................... 225
   Mei-Hung Chiu, Jing-Wen Lin and Chin-Cheng Chou

14 Overview of Science Education Research and Practice
   in Korea ............................................................... 245
   Byung-Soon Choi and Aeran Choi

15 Trends in Science Education Research in Turkey:
   A Content Analysis of Key International Journals
   from 1998–2012 .................................................... 275
   Sibel Erduran and Ebru Zeynep Mugalolu

16 Development of Chemistry Education Research (CER)
   in Turkey: A Comparison of CER Papers with International
   Research ............................................................... 289
   Mustafa Sozbilir, Mustafa Akilli, M. Diyaddin Yasar and Hulya Dede

17 Commentary: Who Sets Trends in Science Education?
   I Comment on Four Exemplary Book Chapters ................. 319
   Ilka Parchmann

Part III Assessment and Curriculum

18 School-Based Assessment of Science Students’ Practical
   Skills in Hong Kong ................................................. 325
   Derek Cheung

19 Assessing Israeli Students’ Knowledge in Science—Policy
   and Practice .......................................................... 347
   David Fortus
20 Didactics of Chemistry as a Science: History in Russia .......... 357
Sergey Teleshov and Denis Zhilin

21 Commentary: Assessment: The Pros and Cons
of this Necessary “Evil” ............................................. 377
Norman G. Lederman

Part IV Innovative Technology in Science Education

22 Innovative Lesson Plans in Chemistry Education
for Broadening Sustainable Society ......................... 385
Hiroki Fujii and Haruo Ogawa

23 Role of Open Educational Resources to Support School
Science Education in India ..................................... 409
Sudhakar Agarkar

24 Adapting and Customizing Web-based Inquiry Science
Environments to Promote Taiwanese Students’ Learning
of Science ................................................................. 443
Hsin-Yi Chang, Ying-Shao Hsu and Jung-Yi Hung

25 Technology-Enhanced Science Teaching and Learning:
Issues and Trends ....................................................... 461
Tzu Hua Wang and Kai Ti Yang

26 Commentary: Innovative Curriculum Materials:
Development, Pilot-Testing, and Scaling-Up ............... 483
Xiufeng Liu

Part V Teacher Professional Development and Informal Science
Learning in Science Education

27 Professional Development of Science High School Teachers
in Israel ................................................................. 491
Rachel Mamlok-Naaman, Dvora Katchevich and Avi Hofstein

28 How Have Japanese Rika (School Science) Teachers Traditionally
Formed Their Own Cultures and Improved Their Teaching
Competencies Through Research and Practice? .......... 517
Tetsuo Isozaki

29 From Schools to Nature: Bridging Learning Environments
in Israel ................................................................. 539
Tali Tal
30 Using Community Resources as Funds of Knowledge to Promote Science Learning in Thailand ............................. 553
Chanyah Dahsah and Chaninan Pruekpramool

31 Commentary: Transforming Science Education in Cultural-Historical Context and the Role of Teacher Professional Development ........................................ 569
Angela Calabrese Barton

Index ............................................................................................................. 575