1. Record Nr. UNINA9910742498403321

Autore	A. Shah Akeel
Titolo	New Paradigms in Flow Battery Modelling [[electronic resource] /] / by Akeel A. Shah, Puiki Leung, Qian Xu, Pang-Chieh Sui, Wei Xing
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2023
ISBN	981-9925-24-X
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (389 pages)
Collana	Engineering Applications of Computational Methods, , 2662-3374 ; ; 16
Altri autori (Persone)	LeungPuiki XuQian SuiPang-Chieh XingWei
Disciplina	620.11 621.31242
Soggetti	Electric batteries Materials Computer simulation Fuel cells Mathematical physics Batteries Computer Modelling Fuel Cells Computational Physics and Simulations
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1: Introduction to Energy Storage -- Chapter 2: Introduction to Flow Batteries -- Chapter 3: An Introduction Flow Battery Modelling -- Chapter 4: Latest Developments in Macroscale Models -- Chapter 5: Latest Developments in Ab-Initio to Mesoscopic Models -- Chapter 6: Machine Learning for Flow Battery Systems -- Chapter 7: Future Flow Battery Modelling -- Bibliography.
Sommario/riassunto	This book provides a comprehensive review of the latest modelling developments in flow batteries, as well as some new results and insights. Flow batteries have long been considered the most flexible

answer to grid scale energy storage, and modelling is a key component in their development. Recent modelling has moved beyond macroscopic methods, towards mesoscopic and smaller scales to select materials and design components. This is important for both fundamental understanding and the design of new electrode, catalyst and electrolyte materials. There has also been a recent explosion in interest in machine learning for electrochemical energy technologies. The scope of the book includes these latest developments and is focused on advanced techniques, rather than traditional modelling paradigms. The aim of this book is to introduce these concepts and methods to flow battery researcher, but the book would have a much broader appeal since these methods also employed in other battery and fuel cell systems and far beyond. The methods will be described in detail (necessary fundamental material in Appendices). The book appeals to graduate students and researchers in academia/industry working in electrochemical systems, or those working in computational chemistry/machine learning wishing to seek new application areas. .