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Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Introduction -- Exploring a Novel Redox Mediator Inspired By Biological System -- Investigation on the Kinetic Property of Redox -- Addressing Shuttle Phenomena: Anchored Redox Mediator for Sustainable Redox Mediation -- Conclusion.
Sommario/riassunto	This thesis addresses the introduction of redox mediator into lithium-oxygen batteries to improve their electrochemical performance especially in terms of practical energy density and round-trip efficiency. In chapter 1, basic electrochemistry regarding lithium-oxygen batteries and redox mediators are introduced. In chapter 2 to 4, comprehensive researches including the discovery of a new redox mediator inspired by biological system, the investigation on kinetic property of redox mediator, and the prevention of shuttle phenomenon are introduced, followed by chapter 5 summarizing the contents. This thesis is targeted to students and researchers interested in electrochemistry and energy storage systems.