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| Nota di contenuto | Cover; Title Page; Copyright; Contents; List of Contributors; Preface; Chapter 1 Structural Studies of Oxomanganese Complexes for Water Oxidation Catalysis; 1.1 Introduction; 1.2 Structural Studies of the OEC; 1.3 The Dark-Stable State of the OEC; 1.4 Biomimetic Oxomanganese Complexes; 1.5 Base-Assisted O-O Bond Formation; 1.6 Biomimetic Mn Catalysts for Artificial Photosynthesis; 1.7 Conclusion; Acknowledgments; References; Chapter 2 O-O Bond Formation by a Heme Protein: The Unexpected Efficiency of Chlorite Dismutase; 2.1 Introduction; 2.2 Origins of O ₂ -Evolving Chlorite Dismutases (ClDs) 2.3 Major Structural Features of the Proteins and their Active Sites2.4 Efficiency, Specificity, and Stability; 2.5 Mechanistic Insights from Surrogate Reactions with Peracids and Peroxide; 2.6 Possible Mechanisms; 2.7 Conclusion; Acknowledgements; References; Chapter 3 Ru-Based Water Oxidation Catalysts; 3.1 Introduction; 3.2 Proton-Coupled Electron Transfer (PCET) and Water Oxidation Thermodynamics; 3.3 O-O Bond Formation Mechanisms; 3.4 Polynuclear Ru Water Oxidation Catalysts; 3.5 Mononuclear Ru WOCs; |

3.6 Anchored Molecular Ru WOCs; 3.7 Light-Induced Ru WOCs; 3.8 Conclusion
 AcknowledgmentsReferences; Chapter 4 Towards the Visible Light-Driven Water Splitting Device: Ruthenium Water Oxidation Catalysts with Carboxylate-Containing Ligands; 4.1 Introduction; 4.2 Binuclear Ru Complexes; 4.3 Mononuclear Ru Complexes; 4.3.1 Ru-O₂N-N₃ Analogs; 4.3.2 Ru-O₂N₂-N₂ Analogs; 4.4 Homogeneous Light-Driven Water Oxidation; 4.4.1 The Three-Component System; 4.4.2 The Supramolecular Assembly Approach; 4.5 Water Oxidation Device; 4.5.1 Electrochemical Water Oxidation Anode; 4.5.2 Photo-Anode for Water Oxidation; 4.6 Conclusion; References
 Chapter 5 Water Oxidation by Ruthenium Catalysts with Non-Innocent Ligands5.1 Introduction; 5.2 Water Oxidation Catalyzed by Dinuclear Ruthenium Complexes with NILs; 5.3 Water Oxidation by Intramolecular O-O Coupling with [Ru II₂(-Cl)(bpy)₂(btpyan)]³⁺; 5.4 Mononuclear Ru-Aqua Complexes with a Dioxolene Ligand; 5.4.1 Structural Characterization; 5.4.2 Theoretical and Electrochemical Characterization; 5.5 Mechanistic Investigation of Water Oxidation by Dinuclear Ru Complexes with NILs: Characterization of Key Intermediates; References
 Chapter 6 Recent Advances in the Field of Iridium-Catalyzed Molecular Water Oxidation6.1 Introduction; 6.2 Bernhard 2008 [11]; 6.3 Crabtree 2009 [12]; 6.4 Crabtree 2010 [13]; 6.5 Macchioni 2010 [14]; 6.6 Albrecht/Bernhard 2010 [15]; 6.7 Hetterscheid/Reek 2011 [16,17]; 6.8 Crabtree 2011 [18]; 6.9 Crabtree 2011 [19]; 6.10 Lin 2011 [20]; 6.11 Macchioni 2011 [21]; 6.12 Grotjahn 2011 [22]; 6.13 Fukuzumi 2011 [23]; 6.14 Lin 2012 [24]; 6.15 Crabtree 2012 [25-27]; 6.16 Albrecht/Bernhard 2012 [28]; 6.17 Crabtree 2012 [29]; 6.18 Beller 2012 [30]; 6.19 Lin 2012 [31]; 6.20 Lloblet and Macchioni 2012 [33] 6.21 Analysis

Sommario/riassunto

Photocatalytic water splitting is a promising strategy for capturing energy from the sun by coupling light harvesting and the oxidation of water, in order to create clean hydrogen fuel. Thus a deep knowledge of the water oxidation catalysis field is essential to be able to come up with useful energy conversion devices based on sunlight and water splitting. Molecular Water Oxidation Catalysis: A Key Topic for New Sustainable Energy Conversion Schemes presents a comprehensive and state-of-the-art overview of water oxidation catalysis in homogeneous phase, describing in detail the most important