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Nota di contenuto	Introduction -- Literature Review -- Enhanced CO2-to-CH4 conversion via grain boundaries oxidation effect in CuAg systems -- Revealing real active sites in intricate grain boundaries assemblies on electroreduction of CO2 to C2+ products -- Stabilized Cu+-OH species on in situ reconstructed Cu nanoparticles for CO2-to-C2H4 conversion in neutral media -- Conclusion and Outlook.
Sommario/riassunto	The electrocatalytic reduction of CO into high-value multi-carbon products represents a pathway toward carbon neutrality and sustainable chemical production. The transition from lab-scale studies to industrial-scale implementation helps bridge the gap theory and practice. This book explores the mechanism and functional design of electrocatalysts for CO electroreduction, focusing on bridging the gap

between lab-scale research and industrial implementation. It investigates the role of grain boundary structures, oxidation states, and interfacial microenvironments in stabilizing Cu-based catalysts, which improve the production of multi-carbon products. Additionally, this work introduces new approaches to modulate copper oxidation states, leading to improved catalytic performance. By integrating fundamental insights with industrial feasibility, this book offers a guide for researchers and engineers to developing next-generation CO electrolysis technologies, thereby contributing to carbon-neutral chemical manufacturing and sustainable energy solutions. In addition, this book: Bridges between lab-scale studies and industrial implementation, offering guidance for actual applications Provides information on catalysts' design and modulation to help improve their selectivity and stability Serves as a resource for professionals working towards sustainable and carbon-neutral chemical manufacturing.