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Nota di contenuto

Chapter 1 - Spectral Selective Solar harvesting and Energy Generation via Transparent Building Skin -- Chapter 2. Low Energy Adaptive Biological Material Skins from Nature to Buildings -- Chapter 3. Dynamic Electro-, Mechanochromic Materials and Structures for Multifunctional Smart Windows -- Chapter 4. Material programming for Bio-Inspired and Bio-based Hygromorphic Building Envelopes -- Chapter 5. Solar-Thermal Conversion in Envelope Materials for Energy Savings -- Chapter 6. Thermally Responsive Building Envelopes from Materials to Engineering -- Chapter 7. Energy Performance Analysis of Kinetic Façades by Climate Zones -- Chapter 8. Integration of Solar Technologies in Facades: Performances and Applications for Curtain Walling -- Chapter 9. Interdependencies Between Photovoltaics and Thermal Microclimate -- Chapter 10. Material Driven Adaptive Design Model for Environmentally-Responsive Envelopes -- Chapter 11. Design Principles, Strategies, and Environmental Interactions of Dynamic Envelopes -- Chapter 12. Aesthetics and Perception Dynamic Facade Design with Programmable Materials -- Chapter 13. Design Research on Climate-Responsive Building Skins from Prototype and Case Study Perspectives. .

Sommario/riassunto

Conventional building skins are constructed as static structures upon the typical design conditions in terms of external climate and internal occupant activities. This generates dissociation between the envelope structure and its environment. With the emerging advanced materials, such as chromic-based materials, spectrally selective coatings, and transparent photovoltaic, more dynamic and smarter building skins are now achievable and constructible. This book updates readers on the key areas of smart building skins embodied in the novel advanced materials with unique structures and smart properties that enable multiple functions in energy efficiency, solar harvesting, and environmental greenness. It synergistically integrates the topics and knowledge of material design and experimental studies, theoretical analyses of building energy-saving mechanisms and solar energy utilization, and new design methodologies and processes taking advanced materials into account at different scales - from nano to the macroscale. .