1. Record Nr. UNINA9911061835603321

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Titolo	Molecular Robotics II : Toward Chemical AI / / edited by Satoshi Murata, Takashi Nakakuki, Taro Toyota, Shin-ichiro Nomura, Akinori Kuzuya
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2026
ISBN	981-9523-94-X
Edizione	[1st ed. 2026.]
Descrizione fisica	1 online resource (387 pages)
Collana	Computer Science Series
Altri autori (Persone)	Murata
Disciplina	629.892
Soggetti	Robotics Bionics Biochemistry Bioinspired Technologies
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- From Molecular Robotics to Molecular Cybernetics -- Functional Expansion of DNA Molecule: Stimulus-Responsive Nucleic Acids -- Boosters for DNA reactions -- Design and application of DNA origami actuators -- Expansion of molecular systems function with the use of artificial nucleic acids -- What are artificial membrane devices in molecular robotics? -- Synthetic DNA nanopore -- Artificial Ion Channel Peptide -- Probe-type artificial cell membrane system -- Fully synthetic transmembrane channels -- Protein and Peptide nanopores.
Sommario/riassunto	This book proposes an innovative concept of chemical AI and discusses fundamental technologies, methods, and theories used for Molecular Cybernetics. Research on so-called “chemical artificial intelligence” (CAI) is an emerging field with the aim of constructing information-processing systems with learning capabilities based on chemical methodologies. This can be regarded as an attempt to reconstruct Cybernetics using molecular based systems. Many chemical reaction systems with computational abilities are proposed, but most are fixed functions that deliver molecular output for a given molecular input. On the other hand, chemical AI is a system with learning capability; namely, the output should be variable and gradually change upon repeated molecular inputs. Toward “multicellular artificial cell systems”

in Molecular Cybernetics, in this book, fundamental technologies, methods, and theories used for (1) assembling CAI systems consisting of many liposomes with different functions (Liposome Assembling Technologies), (2) achieving communication over two lipid-bilayer compartments (Molecular Communication), (3) achieving recursiveness and plasticity in chemical reaction systems (Memory and Learning circuit), and (4) reconfiguring the network topology by liposome deformation (Molecular Actuation) are accommodated.