

1. Record Nr.	UNINA9910616369103321
Titolo	Scanning Ion Conductance Microscopy // edited by Tilman E. Schäffer
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2022
ISBN	9783031144431 9783031144424
Edizione	[1st ed. 2022.]
Descrizione fisica	1 online resource (238 pages)
Collana	Bioanalytical Reviews, , 1867-2094 ; ; 3
Disciplina	502.82
Soggetti	Materials - Microscopy Analytical chemistry Biophysics Nanoscience Biomaterials Cells Microscopy Analytical Chemistry Nanoscale Biophysics Biomaterials-Cells
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	The evolution of scanning ion conductance microscopy -- Scanning ion conductance microscopy and atomic force microscopy: A comparison of strengths and limitations for biological investigations -- Ions and electrons with scanning ion conductance microscopy -- Ion channel recording with a smart patch-clamp system -- Understanding cardiac structure and function at nanoscale resolution with SICM -- Local Electrochemical Characterization using Scanning Electrochemical Cell Microscopy -- Comparison of scanning ion conductance microscopy with scanning electron microscopy for imaging cells and tissues -- Correlating scanning ion conductance and super-resolved fluorescence microscopy.
Sommario/riassunto	This book provides a selection of recent developments in scanning ion

conductance microscopy (SICM) technology and applications. In recent years, SICM has been applied in an ever-increasing number of areas in the bioanalytical sciences. SICM is based on an electrolyte-filled nanopipette with a nanometer-scale opening, over which an electric potential is applied. The induced ion current is measured, which allows to directly or indirectly quantify various physical quantities such as pipette-sample distance, ion concentration, sample elastic modulus among many others. This makes SICM well suited for applications in electrolytes - most prominently for the study of live cells. This book starts with a historic overview starting from the days of the invention of SICM by Paul Hansma at the University of California at Santa Barbara in 1989. SICM is a member of the family of scanning probe microscopies. It is related to another prominent member of the family, atomic force microscopy (AFM), which has found application in almost any field of nanoscale science. The advantages and disadvantages of SICM over AFM are also outlined. One of the most effective and break-through applications of SICM nanopipettes is in electrochemistry. The different routes and applications for doing electrochemistry using nanopipettes are also discussed. In addition the book highlights the ability of SICM for surface positioning with nanometer precision to open up new vistas in patch clamp measurements subcellular structures. Finally the book presents one research area where SICM has been making a lot of contributions, cardiac research and the endeavors to combine SICM with super-resolution optical microscopy for highest-resolution joint topography and functional imaging.
