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Titolo	Quantitative Infrared Spectroscopy for Understanding of a Condensed Matter / / by Takeshi Hasegawa
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ISBN	4-431-56493-4
Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (XI, 200 p. 115 illus., 55 illus. in color.)
Disciplina	543.2-543.8
Soggetti	Spectroscopy Chemoinformatics Physical chemistry Materials science Spectroscopy/Spectrometry Computer Applications in Chemistry Physical Chemistry Characterization and Evaluation of Materials
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
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Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Infrared spectroscopy as a vibrational spectroscopy -- Normal modes -- Light absorption by a molecule: 1. Understanding by quantum mechanical approach -- Selection rule of IR spectroscopy -- Light absorption by a molecule: 2. Understanding by electrodynamical approach -- Fundamentals of FT-IR -- Two representations of spectra: Time- and frequency-domain representations -- Fourier transform relationship -- Introduction of Michaelson interferometer -- Representative detectors -- Sampling techniques -- Surface analysis using FT-IR -- Boundary conditions in electrodynamics -- Thin-film approximation -- Surface selection rules for surface spectroscopies -- Chemometrics for FT-IR -- Limitation of Beer’s law -- Expansion of Beer’s law: CLS regression -- Inverse Beer’s law: ILS regression -- Mathematical expansion of CLS: PCA -- Merge of ILS and PCA: PCR -- Independent residual terms: PLS.
Sommario/riassunto	This book is intended to provide a course of infrared spectroscopy for quantitative analysis, covering both bulk matter and surface/interface

analyses. Although the technology of Fourier transform infrared (FT-IR) spectroscopy was established many years ago, the full potential of infrared spectroscopy has not been properly recognized, and its intrinsic potential is still put aside. FT-IR has outstandingly useful characteristics, however, represented by the high sensitivity for monolayer analysis, highly reliable quantitativity, and reproducibility, which are quite suitable for surface and interface analysis. Because infrared spectroscopy provides rich chemical information—for example, hydrogen bonding, molecular conformation, orientation, aggregation, and crystallinity—FT-IR should be the first choice of chemical analysis in a laboratory. In this book, various analytical techniques and basic knowledge of infrared spectroscopy are described in a uniform manner. In particular, techniques for quantitative understanding are particularly focused for the reader's convenience.