

Contents

Part I History and Progress of X-ray Absorption Fine Structure (XAFS)

- 1 History and Progress of X-Ray Absorption Fine Structure (XAFS)** 3
Yasuhiro Iwasawa

Part II Theory and Analysis of XAFS

- 2 Theory and Analysis of XAFS** 13
John J. Rehr, Joshua J. Kas, Fernando D. Vila,
and Matthew Newville

Part III Sources and Measurement Methods for XAFS

- 3 Synchrotron-Radiation Sources, X-ray Optics and Beamlines** 53
Tomoya Uruga
- 4 XFEL** 63
Makina Yabashi and Tetsuo Katayama
- 5 Measurements and Detectors** 67
Masaharu Nomura
- 6 Cell Designs for In Situ and Operando Studies** 75
Dmitry E. Doronkin, Henning Lichtenberg,
and Jan-Dierk Grunwaldt

Part IV Advanced XAFS Techniques

- 7 Quick XAFS** 93
Tomoya Uruga

8	Energy Dispersive XAS	109
	Sakura Pascarelli and Olivier Mathon	
9	Pump Probe XAFS	127
	Toshihiko Yokoyama and Yohei Uemura	
10	Spatially Resolved XAFS	133
	Mizuki Tada and Nozomu Ishiguro	
11	Computed Laminography XAFS	149
	Mizuki Tada and Hirosuke Matsui	
12	X-Ray Absorption with Transmission X-Ray Microscopes	157
	Frank de Groot	
13	<i>Operando</i> EXAFS and XANES of Catalytic Solids and Related Materials	167
	Gareth T. Whiting, Florian Meirer, and Bert M. Weckhuysen	
14	XAFS for Ultra Dilute Systems	193
	Kiyotaka Asakura	
15	Reflection XAFS	207
	Francesco d’Acapito	
16	High-Energy Resolution XAS	229
	Frank de Groot	
17	Nonresonant Inelastic X-ray Scattering and X-ray Raman Scattering	237
	Timothy T. Fister	
18	Molecular Dynamics Simulations and XAFS (MD-XAFS)	251
	Gregory K. Schenter and John L. Fulton	
Part V XAFS Applications		
19	Metal Nanocatalysts	273
	Yuanyuan Li and Anatoly I. Frenkel	
20	XAS Techniques to Determine Catalytically Active Sites in Zeolites: The Case of Cu-Zeolites	299
	Jeroen A. van Bokhoven and Carlo Lamberti	
21	Designed Surfaces for Active Catalysts	317
	Satoshi Muratsugu, Mizuki Tada, and Yasuhiro Iwasawa	
22	Fuel Cells by Advanced XAFS Techniques	335
	Mizuki Tada and Yasuhiro Iwasawa	

23	Secondary Batteries	351
	Toshiaki Ohta	
24	Surfaces	365
	Hiroshi Kondoh	
25	Sensors	383
	Hudson W.P. Carvalho, David Degler, Nicolae Barsan, and Jan-Dierk Grunwaldt	
26	Probing Structure and Reactivity of Metal Centers in Metal–Organic Frameworks by XAS Techniques	397
	Elisa Borfecchia, Luca Braglia, Francesca Bonino, Silvia Bordiga, Sigurd Øien, Unni Olsbye, Karl Petter Lillerud, Jeroen A. van Bokhoven, Kirill A. Lomachenko, Alexander A. Guda, Mikhail A. Soldatov, and Carlo Lamberti	
27	Homogeneous Catalysis: From Metal Atoms to Small Clusters	431
	John C. Linehan, Mahalingam Balasubramanian, and John L. Fulton	
28	Enzymes and Models	451
	Junko Yano and Vittal Yachandra	
29	Green Catalysts	467
	Adam F. Lee	
30	Environmental Catalysts	491
	Kazuhiko Dohmae	
31	Solid–Liquid Interfaces	505
	Takuya Masuda, Toshihiro Kondo, and Kohei Uosaki	
32	Three-Dimensional Structures on Oxide Single-Crystal Surfaces	527
	Kiyotaka Asakura	
	Index	539

XAFS Techniques for Catalysts, Nanomaterials, and
Surfaces

Iwasawa, Y.; Asakura, K.; Tada, M. (Eds.)

2017, IX, 556 p. 259 illus., 226 illus. in color., Hardcover

ISBN: 978-3-319-43864-1