

CONTENTS

Preface	N. Kosugi
Present Status of Light Source and Beam Lines	
Status of the UVSOR Accelerator Complex in 1994	
H. Hama, T. Kinoshita and J. Yamazaki	
1	
Beam Lines in 1994	
M. Kamada	
3	
BL1A	Soft X-Ray Beamline for Photoemission - Photoabsorption Spectroscopy
BL1B, 7B	Seya-Namioka Monochromator
BL2B1	Soft X-Ray Beamline for Solids and Solid Surfaces
BL3A1	Irradiation Port with Undulator Radiation
BL3A2	Gas-Phase Dissociative Photoionization Apparatus
BL5B	Calibration Apparatus of Optical Elements
BL6A1	Fourier Transform Far-Infrared Spectroscopy
BL6A2	Photoelectron Spectrometer for Solids and Surfaces
BL6B	Fourier-Transformed Far-Infrared Spectrometer
BL7A	Soft X-ray Spectrometer for Solids
BL8A	Free Port
BL8B1	Photoabsorption and Photoionization Spectrometer
BL8B2	Angle-Resolved UPS System
Research Activities	
Linewidth Measurements of the UVSOR Free Electron Laser	
K. Kimura, H. Hama, J. Yamazaki, T. Kinoshita and G. Isoyama	
19	
Design Concept of New Monochromator for Circularly Polarized Synchrotron Radiation in the Energy Range of 5 - 250 eV	
M. Kamada, K. Sakai, S. Tanaka, S. Kimura, A. Hiraya, M. Hasumoto, S. Ohara, K. Nakagawa, K. Ichikawa, K. Soda, K. Fukui, Y. Fujii and E. Ishiguro	
22	
Construction of a New UHV Apparatus for Soft X-Ray Photoemission - Photoabsorption Spectroscopy	
Y. Takata, M. Nakamura and N. Kosugi	
24	
Resonant Ni 3p and 3s Photoemission for the Ni 2p Core-Excitation in NiO	
M. Nakamura, Y. Takata and N. Kosugi	
26	
A Soft X-ray Core-Absorption Study on the Conduction Bands of the Cu and Ag Photodoped Amorphous GeSe ₂	
S. Hosokawa, T. Kouchi, I. Ono, A. Furuta, M. Taniguchi, Y. Takata and N. Kosugi	
28	

Polarized Vacuum-UV Absorption and Reflection Spectra of Poly(tetrafluoroethylene) and Its Model Compound K. Nakagawa, T. Miyamae, R. Mitsumoto, H. Ishii, Y. Ouchi and K. Seki	30
Two Types of STE Luminescence in PbCl ₂ Crystal M. Kitaura, H. Nakagawa, K. Fukui, M. Fujita and T. Miyanaga	32
Photoionization Potentials of Fullerenes (C ₆₀ ~ C ₈₄) in Nonpolar Liquid I. Shimoyama, K. Nakagawa, C. Fujikawa, K. Morii, T. Mitani and R. Katoh	34
Emission and Excitation Spectra of (C _n H _{2n+1} NH ₃) ₂ CdCl ₄ : n=1, 2, 3 A. Ohnishi, T. Yamada, T. Yoshinari, K. Kan'no, I. Akimoto and T. Kamikawa	36
Photoyield Measurements of CVD Diamond N. Eimori, A. Hatta, T. Ito and A. Hiraki	38
Impurity-Induced Quenching of Auger-Free Luminescence in Mixed CsCl _{1-x} I _x System M. Itoh, H. Hara, N. Ohno, H. Yoshida, K. Kan'no and S. Hashimoto	40
Recombination Luminescence from Self-Trapped Excitons in BaFCl A. Ohnishi, K. Kan'no, Y. Iwabuchi and N. Mori	42
A Fast Decay Component of the BG-Emission in KCl:I M. Abe, T. Matsumoto and K. Kan'no	44
Photo-Luminescence in Alkali Earth Fluorides A. Ejiri, A. Hatano and K. Nakagawa	46
Relaxation Dynamics of Free Excitons in Alkali Iodides T. Hayashi, T. Tsujibayashi and M. Watanabe	48
Silicon Precipitation in Surface Layers of Amorphous Si ₃ N ₄ Films with ArF Excimer Laser Irradiation K. Nakamae, K. Kurosawa and R. Sonouchi	50
Photochemistry of Cyanogen Bromide in the 40 - 120 nm Region K. Kanda, T. Nagata, M. Kono, A. Hiraya and K. Shobatake	52
Photoabsorption and Fluorescence Cross Sections of SiCl ₄ in the 40 - 120 nm Region T. Ibuki, M. Kono and K. Shobatake	54
Absorption and Fluorescence Studies of CCl ₃ CN in the Vacuum Ultraviolet Region K. Tabayashi, Y. Shimomura, M. Akao, K. Saito, M. Kono, H. Ohashi and K. Shobatake	56

VUV Absorption and CN($B^2\Sigma_g^+$) Excitation Spectra of Chlorinated Acetonitriles M. Akao, K. Tabayashi, Y. Shimomura, K. Saito, M. Kono, H. Ohashi and K. Shobatake	58
Photodissociation Dynamics of HNCO Studied by Photofragment Fluorescence Polarization Measurements Y. Matsushita, Y. Hikosaka, M. Kono, K. Shobatake and T. Hikida	60
Core Electron Absorption Spectra of Undrawn and Drawn Polyester Films I. Ouchi, I. Nakai, M. Kamada, S. Tanaka and T. Hagiwara	62
$3p \rightarrow 3d$ Resonant Photoemission Spectra of LaTO ₃ (T=Co, Ni) Y. Taguchi, M. Kageyama, K. Soda, T. Katsumi, S. Tanaka, K. Ishikawa, Wu Quing, K. Okuda and O. Aita	64
Orientation and Disorption of Oxygen Admolecules on a Pt (113) Stepped Surface T. Yamanaka, T. Matsushima, S. Tanaka and M. Kamada	66
NEXAFS Study on the Absorption Structure of N ₂ O on Si (100) (2×1) Surface K. Sawabe and Y. Matsumoto	68
The Studies on the Core-Excitonic Effect of Aromatic Hydrocarbons in NEXAFS Spectroscopy H. Oji, R. Mitsumoto, E. Ito, H. Ishii, Y. Ouchi, K. Seki and N. Kosugi	70
Photoemission Studies on Valence Band Structure of AgSbO ₃ M. Yasukawa, H. Hosono, N. Ueda and H. Kawazoe	72
Photoemission Study of TlAlF ₄ H. Mizoguchi, T. Omata, H. Hosono, N. Ueda and H. Kawazoe	74
Surface Core Exciton of Alkali Chloride Film on Si (100) S. Tanaka, N. Takahashi, M. Kamada and K. P. Lee	76
Annealing Effect of NaCl Film on Si (100) Surface S. Tanaka, M. Kamada and K. P. Lee	78
Observation of Doubly Excited Rydberg States of CO ₂ by Positive Ion - Negative Ion Coincidence Spectroscopy H. Yoshida and K. Mitsuke	80
Photodarkening Phenomena in Amorphous Chalcogenide Films K. Hayashi, D. Kato and K. Shimakawa	82
Preparation of ZnO Thin Films from DEZn at Various Temperatures Using undulator Radiation (UR) - Excited CVD A. Ganjoo, S. Ikeda, K. Maeda and A. Yoshida	84

Time Reponse of Excited-State Na Desorption from NaCl (Temperature Dependence)	
S. Hirose and M. Kamada	86
Observation and Investigation of Solid C ₆₀ F ₄₈ and C ₇₀ F ₅₈ Luminescence	
A. Kolmakov, V. Stankevitch, V. Bezmelnitsin, A. Rizkov, V. Sokolov, N. Svechnikov, I. Akimoto, T. Matsumoto, K. Kan'no, S. Hirose and M. Kamada	88
Radiative Transitions in C ₆₀ Thin Films under SR Excitation	
M. A. Telekhin, N. Yu. Svechinikov, M. Kamada, K. Kan'no, V. G. Stankevitch, A. A. Kolmakov, V. A. Stepanov, V. N. Bezmelnitsin, T. Matsumoto, I. Akimoto, A. Ohnishi and M. Ashida	90
Dissociative Photoionization of Iron Pentacarbonyl in the Range 30 - 120 eV. I. Observation of New Molecular Dications and C-O Bond Rupture in the Ligand	
Y. Tamenori and I. Koyano	92
Dissociative Photoionization on Iron Pentacarbonyl in the Range 30 - 120 eV. II. A Photoion - Photoion Coincidence Study of the Dissociation of Doubly and Triply Charged Parent Ions	
Y. Tamenori and I. Koyano	94
Dissociative Single and Double Photoionization of CS ₂	
T. Masuoka	96
Kinetic-Energy Release in the Dissociation of SO ₂ ²⁺	
T. Masuoka	98
Kinetic-Energy Release in the Dissociation of CO ₂ ²⁺	
T. Masuoka, E. Nakamura and A. Hiraya	100
Single- and Double-Photoionization Cross Sections of Carbon Dioxide (CO ₂) and Ionic Fragmentation of CO ₂ ⁺ and CO ₂ ²⁺	
T. Masuoka	102
Photodissociation of CF ₃ Br Induced by Br (3d) Excitation	
T. Senga, M. Kawasaki, A. Hiraya and T. Ibuki	104
Development of a Position-Sensitive Detection System for VUV Photoelectron Spectroscopy	
K. Mitsuke, Y. Hikosaka, H. Hattori and T. Hikida	106
Two-Dimentional Photoelectron Spectroscopy of NO	
Y. Hikosaka, H. Hattori, T. Hikida and K. Mitsuke	108
Autoionization of an Excited Valence State of C ₂ H ₂	
H. Hattori and K. Mitsuke	110

Synchrotron Radiation Photochemistry in Low-Temperature Condensed Layers of Organo-Aluminium Compounds on SiO ₂ Surface Investigated by Burid-Metal-Layer Infrared Reflection Absorption Spectroscopy Y. Imaizumi, Y. Tsusaka and T. Urisu	112
Synchrotron Radiation Excited Growth of ZnTe by Atomic Layer Epitaxial Technique Using Metalorganic Sources T. Ogata, S. I. Gheyas, H. Ogawa and M. Nishio	114
Synchrotron Radiation Assisted Surface Process of Adsorbed Diethylzinc on GaAs (100) S. I. Gheyas, T. Ogata, H. Ogawa and M. Nishio	116
Low Temperature Growth of II-VI Compound Semiconductors by Synchrotron Radiation Using Metalorganic Sources T. Ogata, S. I. Gheyas, H. Ogawa and M. Nishio	118
In Situ Observation of SR-Induced a-Si Deposition by Using BML-IRAS A. Yoshigoe, M. Nagasono, K. Mase and T. Urisu	120
Synchrotron Radiation Excited Etching of Silicon Surface Studied by Velocity Distribution Measurements of Desorbed Species (III) H. Ohashi and K. Shobatake	122
Beamsplitting and Polarization Properties of Cr/C Transmission Multilayers Close to the Carbon K-Edge F. Schäfers, A. Furuzawa, K. Yamashita, M. Watanabe and J. H. Underwood	124
Optical Properties of Compound Semiconductors in VUV Region Q. Guo, Y. Mitsuishi, H. Ogawa and A. Yoshida	126
VUV Reflection Spectra of Amorphous Chalcogenide Films K. Hayashi, D. Kato and K. Shimakawa	128
Characterization of Normal Incidence Multilayer Telescope in 100 - 300 Å Region K. Yamashita, H. Kunieda, T. Yamazaki, K. Ikeda, K. Misaki, Y. Takizawa, M. Nakamura and I. Yoshikawa	130
Angular Distribution of Ne Metastable Desorption Induced by Exciton Formation at the Surface of Solid Ne T. Hirayama, T. Nagai, M. Abo, I. Arakawa, M. Sakurai and K. Mitsuke	132
VUV Reflectivity Spectra of Rare-Earth Sesquioxides IV F. Arai, S. Kimura, M. Ikezawa and M. Ishigame	134
Far Infrared Absorption of Ice XI M. Kobayashi and D. Tazawa	136

Size-Dependence of Phase Transition of CdS Microcrystals T. Nanba, Y. Notake and G. P. Williams	138
Multichannel FT Spectrometer for Mid-Infrared S. Asaka and J. S. Ahn	140
Far Infrared Transmission of SmTe under High Pressure Y. S. Kwon, T. S. Park, K. S. An, I. S. Jeon, S. Kimura, C. Y. Park, T. Nanba and T. Suzuki	141
Infrared Low Frequency Study of the Phase Transitions in LiKSO ₄ and LiNaSO ₄ Single Crystals F. Rull Perez and S. Kimura	142
Optical Observation of Interaction between Low Frequency Plasma and Magnetic Field in La _{2-x} Sr _x CuO ₄ (x≈0.1) S. Kimura, M. Ikezawa, H. Kojima, I. Tanaka, T. Watanabe and M. Tachiki	144
Far-Infrared and Millimeter Wave Spectra of Superionic Glasses of AgI-AgPO ₃ T. Awano and T. Nanba	146
Photoemission Study of the Al-Pd-Mn F1-Type Icosahedral Phase M. Mori, M. Kamada, T. Miyazaki and T. Ishimasa	148
Decay Curves for Auger-Free Luminescence from BaF ₂ Excited near the Ba 4d Edges S. Kubota, M. Kamada and M. A. Terekhin	150
Electron Spectroscopy of Stage 2 FeCl ₃ -Graphite Intercalation Compound T. Abe, Y. Mizutani, E. Ihara, M. Asano, T. Harada, M. Kawase, S. Nakanishi, H. Itoh and M. Kamada	152
Metallic Na Formation in NaCl Crystals by Electron and VUV Photon Irradiation S. Owaki, S. Koyama, M. Takahashi and M. Kamada	154
Photon-Energy Dependence of Excited-State Na Desorption from Na Halides S. Hirose and M. Kamada	156
Photoemission Study of Iodium Nitride K. Fukui and M. Kamada	158
Resonant Photoemission of R ₃ Au ₃ Sb ₄ (R = La, Ce and Pr) S. Kimura, M. Kamada, K. Katoh and M. Kasaya	160
Far-Infrared Reflectance of β''-(BEDT-TTF) ₂ AuBr ₂ : Coexistence of Free Carriers and a Single-Particle Gap at 2Δ = 130 cm ⁻¹ A. Ugawa, D. B. Tanner and K. Yakushi	162

Mo L _{III} -Edge and Mg K-Edge XANES Study of Local Structure of MoO ₃ -MgO Binary Oxide H. Aritani, T. Tanaka, T. Funabiki, S. Yoshida and S. Hasegawa	164
A XANES Study on the Dehydration Process of Magnesium Hydroxide T. Yoshida, Y. Tanaka, H. Yoshida, T. Funabiki, S. Yoshida and T. Murata	166
Nd L-Edge XANES Study of Nb Compound Catalysts Y. Nishino, M. Aida, S. Matsuhara, K. Nakamura and S. Hasegawa	168
Throughput at BL7A Using Wiggler Operated at 2 T and 4 T M. Watanabe and O. Matsudo	170
Na K XANES Spectra of Silicate Crystals and Glasses T. Murata, S. Hayashi and G. E. Brown Jr.	172
S-K and P-K Polarized Absorption Spectra of Layered Thiophosphates MPS ₃ (M=Mn, Fe, Ni, Zn, Mg) A. Kamata, S. Nakai, T. Kashiwakura, N. Kozuka, T. Yokohama, H. Tezuka and O. Matsudo	174
VUV Reflection Spectra of Electrically Polarized TiO ₂ -Containing Silicate Glass with Optical Second Harmonic Generation Activity K. Kurachi, J. Matsuoka, H. Nasu and K. Kamiya	176
Optical Characteristics of Fluorine -Doped SiO ₂ Formed by Plasma-Enhanced Chemical Vapor Deposition K. Ishii and Y. Ohki	178
Reflection Spectra of Nonequilibrium Solid Solutions in Alkali Bromides S. Hashimoto and M. Inaba	180
Dispersion Properties of Excitons in Thin Alkali Bromide Crystals N. Ohno, I. Iwaki, S. Hashimoto and M. Itoh	182
VUV Reflection Spectra of LiF Doped Fluoroaluminate Glasses N. Kitamura, K. Fukumi, K. Kadono and H. Yamashita	184
Crystallization Processes of Amorphous CdI ₂ Thin Films K. Fukui, K. Niimi, T. Yamada and H. Nakagawa	186
Time-Resolved Tryptophan Fluorescence of Glycerinated Muscle Fibers M. Taniguchi and I. Yoda	188
SOR Patterning of Plasma Polymerized HMDS Resist with 0.2 Micron Mask S. Morita, G. K. Vinogradov, Y. Koval, C. Shao, R. Inanami and K. Senda	190

SiC Nucleation on Si Substrate for Diamond Formation Using Synchrotron Radiation Enhanced Chemical Vapor Deposition Employing Methanol and H Radical M. Ikeda, M. Hori, T. Goto, M. Inayoshi, M. Hiramatsu, M. Nawata and A. Hiraya	192
Soft X-Ray Microscope with Zone Plate at UVSOR N. Watanabe, S. Aoki, Y. Shimanuki, K. Kawasaki, M. Taniguchi, E. Anderson, D. Attwood, D. Kern, S. Shimizu, H. Nagata, Y. Horikawa, S. Mochimaru and H. Kihara	194
Accumulated Photon Echoes in UV by Using Dispersion Compensation H. Itoh, S. Nakanishi, M. Kawase, H. Fukuda, N. Tsurumachi, H. Inoue, H. Nakatsuka and M. Kamada	196
Performance Test of Constant-Deviation Constant-Length Spherical Grating Monochromator at BL8B1 A. Hiraya, E. Nakamura, J. Adachi, M. Hasumoto, T. Kinoshita, K. Sakai, E. Ishiguro and M. Watanabe	198
The Electronic Structure of Porphyrin / Metal Interfaces Studied by Ultraviolet Photoelectron Spectroscopy D. Yoshimura, S. Narioka, M. Sei, H. Ishii, Y. Ouchi, T. Miyazaki, S. Hasegawa, Y. Harima, K. Yamashita and K. Seki	200
Determination of Azimuthal Orientation of Metal-Free Phthalocyanine on MoS ₂ Surface K. Kamiya, M. Momose, Y. Harada, N. Ueno, T. Miyazaki, S. Hasegawa, H. Inokuchi, S. Narioka, H. Ishii and K. Seki	202
UPS Study of NiPS ₃ and FePS ₃ Crystals by Using Synchrotron Radiation T. Miyazaki, H. Inokuchi, S. Hasegawa, K. P. Lee, K. Ichimura and H. Fujimoto	204
Photoemission Study on Poly (pyridine - 2, 5 - diyl), Poly (2, 2' - bipyridine - 5, 5' - diyl), and their K-doped States T. Miyamae, D. Yoshimura, H. Ishii, Y. Ouchi, T. Miyazaki, T. Koike, T. Yamamoto and K. Seki	206
Synchrotron - Radiation Photoemission Study of <i>in-situ</i> Synthesized DCNQI (N, N' - Dicyanoquinonediimine) - Cu Salts A. Tanaka, A. Chainani, T. Miura, T. Takahashi, T. Miyazaki, S. Hasegawa and T. Mori	208
Ultraviolet Photoelectron Spectra of C ₇₈ and C ₉₆ S. Hino, H. Takahashi, K. Iwasaki, T. Miyazaki, K. Kikuchi and Y. Achiba	210

Appendix

Organization	213
Joint Studies	214
List of Representative of Cooperative Research	215
Program of UVSOR Workshop on Present Status and Future Plans of VUV Beam	
Lines for Solid-State Research	217
List of Publications	219
Ground Plan of the UVSOR Facility	225
Acceralator Complex and Intensity Distribution	226
Beam lines at UVSOR	229
Location	230

