

CONTENTS

A. Survey Paper

Basic Aspects of Gas Discharges <i>J. Kistemaker</i>	1
Heat Transfer to Particles in Thermal Plasma Flows* <i>E. Pfender</i>	
How the Various Physical Properties of Arcs Can Be Used to Design Better Circuit Breakers <i>F. Pinnekamp, G. Mauthe</i>	3
Interaction Among Electric Arc, Gas Flow and Magnetic Field <i>Guo Zengyuan, Bu Weihong</i>	9
The Physical Aspects of Electric-Arc Plasma Generation <i>M.F. Zhukov</i>	19
Plasma Spraying-State of the art and Future Developments <i>Steffens, H.-D., U. Fischer</i>	25
Plasma Technology Research in China <i>Wu Cheng-kang</i>	27

B. Thermal Plasmas (Near Equilibrium)

1. Basic Processes and Modelling

Calculating Method for the Properties of L.T.E. Low-temperature Plasma <i>Han Longheng</i>	34
Calculation of the Flow Field in a Radio Frequency Plasma CVD Reactor <i>Zhao Guoying, Zhu Chingwen</i>	39
Computer Calculation of Phase and Chemical Equilibrium <i>B.G. Trusov</i>	45
Fluid Flow and Heat Transfer in a Three Phase A.C. Plasma Furnace Part 1. Analytical Method <i>Xu Fu, Rong Sheng</i>	47
Fluid Flow and Heat Transfer in a Three Phase A.C. Plasma Furnace Part 2. Numerical Method <i>Chen Xi</i>	51
The Impedance Matching of RF Plasma <i>Chen Yunming</i>	57
Investigation of the Influence of the Electromagnetic Field on the Melts of Refractory Materials in Electric Arc Furnaces <i>Ashimov U.B., Abdurakhmanov E.A.</i>	63

* The text had not arrived when the proceedings went to the printer.

An Investigation of the Propagation Characteristics of Electromagnetic Waves Through a Reentry Plasma Sheath Layer by an Unequally Segmented Model (ISM)	69
<i>Xu Yanhou, Ji Zhenyu, Wang Boyi.</i>	
Kinetic Modeling and Optimization of Plasmaypyrolytical Methane Conversion by Shock Tube Investigations	
<i>H.-D.Klotz, H.Drost, H.-J.Spangenberg,</i>	
<i>G.Schulz, I.Borger.</i>	77
Magnetic Control of the Rotated Electric Arc in Arc Heaters	
<i>Group 801.</i>	79
Modeling of the Free Flight Region of a Cyclone Transferred Arc Plasma Reactor	
<i>L.S.Chen, R.J.Munz.</i>	85
The Modern Thermodynamics of Low Temperature Plasma	
<i>G.B.Sinjarev.</i>	92
Negative Differential Conductivity in an Electron-Beam Controlled Diffuse Discharge for Switching Applications	
<i>G.Schaefer, K.H.Schoenbach, M.Kristiansen,</i>	
<i>B.E.Strickland, R.A.Korzekwa.</i>	94
Numerical Analysis of Magnetic Flux Compression-cylindrical Geometry	
<i>L.L.Altgilbers, S.T.Wu, S.D.Bai</i>	100
On Properties of an A.C.Arc with Moving Boundary	
<i>Rong Sheng.</i>	101
On the Applicability of Available Expressions for Heat Transfer to a Particle Exposed to a Thermal Plasma Flow	
<i>Chen Xi.</i>	107
On the Choice of Effective Interaction Potentials for Particles of Dusted Plasma	
<i>S.W.Temko, S.K.Kuz'min.</i>	115
Performance Characteristics of a Magnetohydrodynamic Laser	
<i>Robert F. Walter.</i>	120
Simulation of the Behaviour of Cladded Thermally Reacting Particles in High-temperature Gas Flows	
<i>G.M.Krylov, O.P.Solonenko.</i>	126
Some Correlation Properties and the Equation of State in an Alkaline Metal Plasma	
<i>Chen Guorong, Lu Quankang.</i>	132
Some Thermophysical and Hydrodynamical Peculiarities of "Molten Particle-surface" Interaction	
<i>V.V.Deineko, O.P.Solonenko, A.I.Fedorchenko.</i>	135
Thermal Conductive Characteristics of Two-temperature Arc Plasma Model and Its Energy Balance Equations in a Magnetic Field	
<i>Tang Fulin</i>	141

2. Diagnostics

Diagnostics on the Gas Mixture Arc Plasma by Monowavelength Laser Interferometry <i>Li Junyue, Zhao Shiqian, Li Yishan, Feng Zhilian</i>	147
Direct Mass Spectrometric Diagnostics of the Plasma Chemistry for A CO ₂ Gas Laser <i>Wang Yuzhi, Liu Jiansheng</i>	153
Red-shift of Hydrogenic Ion Line in High Density Plasma Shizuyo Hashimoto, Kazuya Sakamoto, <i>Hideki Yamai, Kozo Ando</i>	159

3. Plasma Systems

Analysis of Microwave Discharge in Oxygen <i>Reszke E., Parosa R., Rzepka J.</i>	165
D.C.Arc Hydrogen Heater with a Stepped Anode <i>Ji Chongjia, Hong Chuanyu, Qi Longxi, Ma Xiuzhong, Qin Peng</i>	169
Development of the Coal-Fired MHD Plasma Generator <i>Sha Ciwen, Ju Zixiang, Yang Aihua, Dong Chengkang, Liang Cufang, Zhang Guichun</i>	175
An Experimental and Theoretical Study of Anode Temperature Field of Arc Plasma Generator with Step Anode <i>Fan Yousan, Gu Bingwu</i>	183
Fluidization and Current Flow Characteristics of Co-flow Type Plasma Fluidized Bed Reactors <i>Jen-Shih Chang, S.Mielke, S.Matsumura</i>	191
Inductive Plasma Discharge with Low Frequencies <i>Xue Minglun, Chen Yunming</i>	198
Investigation of Gas-injected, Washer-stack Plasma Gun <i>Huang Chaosong, Ren Zhaoxing, Qiu Lijian</i>	202
New Type of Microwave Plasma Cavity <i>Reszke E., Parosa R.</i>	208

4. Melting and Evaporation

The Characteristics of the Reverse Polarity Soft Plasma Arc and Its Application for Powder Surfacing <i>Chen Deshan, Li Aiguo, Zhao Zhiguang, Liu Li.</i>	212
The Development and Clinical Practice of Plasma Scalpel Unit <i>Ji Zhenyu, Zhang Hao, Huang Donglin, Du Huasheng, Li Jiashou.</i>	217

A Plasma Scalpel: An Experimental Study and Its Clinical Applications

Zhang Xiaohua, Bao Jingxiang 224

The Plasma Process Control by Emission Spectroscopy in the Case of the Purification of Metallurgical Grade Silicon

J.Amouroux, D. Morvan, H.Apostolidou, F.Slootman, C.Trassy 226

Preliminary Investigation on Low Pressure Plasma Spraying

Wen Lishi, Guan Kan, Yu Bing,

Fu Lishun, Zhou Xuke, Zhou Xiuju 232

Progress in Spray Powders for Atmospheric (APS) and

Vacuum Plasma Spray (VPS) Processes

H.Eschnauer, A. R. Nicoll 237

Vacuum Plasma Spraying of Titanium

E.Lugscheider, P.-J.Lu 250

Water Constricted Air Plasma Cutting Arc

Wei Junquan, Ouyang Tao, Lu Chongren 256

5. Metallurgy

An Analysis of Transition Processes in the System of Ore-smelting

Furnace Power Supply

Ashimov U.B., Balgabekov A.K., Bolotov A.V.,

Trofimov G.G., Ulyashev B.A. 262

Basic Theory and Economics of Three-phase AC Plasma Reactors

W.G.Brown 266

Dependence of Quality of the Fused-and-cast Corundum Products on the Intensity of Failure of the Graphitized Electrodes

Ashimov U.B., Balgabekov A.K., Belogrudov A.G. 273

Electric Technology of Melt Refractories from Industrial Production Waste

Ashimov U.B., Abdurakhmanov E.A., Bolotov Yu.A.

Satvaldiyev D.S. 276

Experimental Study of Smelting Ferromolybdenum by Three Phase A.C. plasma Arc

Ouyang Tong, Cao Yongxian 279

Plasma Smelting Reduction of Ilmenite

Zheng Guoliang 285

The Production of Ferro-chromium in A Transferred—Arc Plasma Furnace

Gen Ling 294

Raman Spectra Determination of Main Phases in Plasma Synthesis Products

Ashimov U.B., Arymbaev O.Z., Bolotov A.V.,

Filkov M.N., Zaretskaya N.P. 300

6. Chemical Synthesis and Pyrolysis

Calcination of Aluminum Hydroxide in A Random-Expanded Plasma Reactor <i>Parosa R., Reszke E., Romanowski J., Hołyś A., Pollo I.</i>	305
Making Fine Tungsten Powder by Plasma Reduction <i>Fan Yousan, Jin Wenzhi, Wang Zujian, Cui Xiaomin.</i>	309
Preparation of Ultrafine Powder of Titanium Carbide in an Arc Plasma <i>Zeng Daquan, Hu Suduan, Zhang Sihui, Huang Daiyong, Cheng Xiande, Ye Shubing.</i>	317
Production of Acetylene from Methane in a Hydrogen Plasma Jet <i>A.Szymański, W.W.Płotczyk, T.Opałińska, A.Resztak.</i>	324
Production of the Ultrafine Powder of Titanium Nitride by R.F. Plasma <i>Zhu Lianxi, Jing Pong, Ran Junguo, Li Shengzhang, Xiao Xianzhi</i>	329
Stannic Dioxide Produced with Arc Gasification Process <i>Kunming Institute of Technology.</i>	336
Study of an Arc Discharge in the Presence of Melted Chromite / FeCr_2O_4 /-Cathode <i>H. Lange, P.Meibus.</i>	338
Thermal Decomposition and Hydrogen Reduction of Chromic Oxide in a RF Plasma <i>A.Huczko, P.Meibus.</i>	344
C. Low Pressure Plasmas (Non-Equilibrium)	
1. Basic Processes and Modelling	
Ar-NH ₃ Mixture Gas Positive Column Plasma <i>J.S.Chang, M.Hayama, S.Ono, S.Teii.</i>	351
Beam-Plasma Instabilities and the Beam Plasma Discharge <i>P.J. Kellogg, R.W. Boswell.</i>	357
Cold Plasma State and the Origin of Life <i>C.I.Simionescu, F.Denes.</i>	363
Drift Waves in EXH Heterogeneous Gas Discharges <i>G.G.Shishkin, V.P.Gerasimov</i>	365
Electron Beam Extracted from the Glow Discharge <i>S.Pekárek, H.Loneková, J.Rosenkranz.</i>	371
Experimental Studies of Electromagnetic Wave Propagation in a Plasma <i>Zhu Naiyi, Li Xuefen, Fang Zhenmin, Lin Ping.</i>	377
Heated Cathode Low Voltage Arc, a New Facility for Unconventional Technologies <i>Musa Geavit, Popescu Alexandrina, Baltog Alexandra, Mustata Ion, Betiu Nicolae</i>	383
Impurities in a Low Temperature Hydrogen RF-plasma <i>J.Freisinger, H.W.Loeb, W.Kraus.</i>	389
Influence of External Circuit Elements on the Parameters of Plasma Double Layer Instabilities <i>M.Sanduloviciu, D.Alexandroaei, R.Schriftwieser</i>	395

High Performance Inert Gas Ion Thruster RIT 10 for Stationkeeping of Communication Satellites	
<i>K.H.Groh, H.W.Velten, H.W.Loeb</i>	401
On Double Layers Produced in a Helium Magnetized Collisional Plasma	
<i>M.Toma, M.Sanduloviciu</i>	402
On the Magnetic Field Role in the Triggering Process of Plasma Double Layer	
<i>S.J.Talasman, M.Sanduloviciu</i>	408
On the Obtaining and Dynamics of a Double Layer Formed at the Transition Region Between Two Negative Glow Plasmas	
<i>D.Alexandroaei, M.Sanduloviciu</i>	414
On the Pupp's Similarity Law for Periodical Phenomena in Glow Discharges of Inert Gases	
<i>L.Biborosch, G.Pop, M.Sanduloviciu</i>	421
Plasma Double Layers Properties of H.F.Plasmoid	
<i>M.Sanduloviciu, V.Melnig, B.Ianopol.</i>	427
Plasma Parameters in a Downstream of Noble Gas-silane Mixture Microwave Discharge Plasma	
<i>M.Kikuchi, J.S.Chang, S.Matsumura, H.Arishima, S.Teii</i>	433
Quantum Processes Acting as Energy Source for Plasma Instabilities	
<i>M.Sanduloviciu</i>	439
Research on Microwave ECR Plasma	
<i>Chen Keqiang, Zhang Erli, Wu Jinfa, Zhen Hansheng, Guan Zuoyao</i>	444
Study of Contact Phenomena of Gases With Sheet Plasma	
<i>K.Sunako, K.Yamauchi, T.Tsugueda, S.Takeshiro, K.Takayama</i>	446
Surface Waves on Cold Nonneutral Plasma Column	
<i>Liu Zuli, Paul.J.Kellogg</i>	452
Time Averaged Plasma Parameter Profiles in a Capacitive Coupling Parallel Plate Electrode Neon Gas RF Discharge Plasma	
<i>T.Kaneda, T.Kubota, M.Ohuchi, Jen-Shih Chang</i>	458
2. Diagnostics	
Probe Diagnostics of a Low Pressure R.F. Plasma	
<i>Zhu Wenhao, Chen Yaoshan</i>	464
Study of the Plasma in HCD Ion Source	
<i>Zhao Wentao, Chen Jianhui</i>	472
3. Polymerization and Surface Treatment	
The Cleaning of Stainless Steel Surface by the D.C.Glow Discharge	
<i>Ning Zhaoyaun, Zheng Jialin, Wei Huang</i>	478

Considerations on Plasma Modification of Polymer Surface Cohesion <i>M.Gheorghiu, M.Sanduloviciu, Gh.Popă, D.Turcu</i>	484
Different Aspects in Catalysis with Plasma Synthesis of Ammonia from Thermal Synthesis <i>Kazuo Sugiyama, Okio Nomura, Hiroshi Miura, Masaaki Oshima, Kiyoshi Akazawa, Tsuneo Matsuda</i>	490
Interaction of Low Temperature Plasma and Polyethylene Terephthalate Fabrics <i>Pei Jinchang, Zhou Baoguan</i>	495
The Kinetics of Ozone Synthesis in an Ozonizer with Polyester Dielectric Layer <i>Pollo Iwo, Ozonek Janusz</i>	501
The Mechanism of the Plasma Polymerization of Ethylene and Propene <i>Liu Xueshu, Zhu Yufen, Chen Xiaobo, Gao Xueqin, Li Xinlin, Chen Jie</i>	506
Plasma Polymerization and Polymer Structure of Hexamethyldisilazane <i>Zhou Kunlin, Cao Weimin</i>	509
Plasma Polymerized X Ray Resists Sensitized by High Z Atoms <i>S.Hattori, M.Hori, H.Yamada, S.Morita, T.Yoneda</i>	514
The Preparation of Conducting Protective Film of Semiconductor Photo-Electrode by Plasma Polymerization <i>Wu Zhenyao, Wu Liyun, Xu Shonglin, Zhuang Quxing</i>	520
Studies of Surface Modification of Polymers by Low Temperature Plasma Institute of Physics, Chinese Academy of Sciences <i>Beijing Institute of Chemical Fibers, Institute of Material Technique, Ministry of Aerospace Engineering, Beijing Wool Textile Research Institute, Beijing, China</i>	525
Studies on the Plasma Treatment of Selective Oil Hydrogenation Catalyst <i>Xong Guizhi, Tao Yi, Zou Wenrong</i>	531
The Study of Mechanism of the Improvement of the Surface of Graphite Fibers Treated by Cold-plasma <i>Wei Yuezhen, Zhang Zhiqian, Tao Xiaoqiu, Su Ji, Liu Lixun, Chen Chuanzheng, Kang Bingjie</i>	537
Study on Mechanism of Octafluorocyclobutane Plasma Polymerization in Gaseous Phase <i>Ye Mu, Chen Jie, Yang Zhenhua, Liu Wei, Xiao Yanwen, Song Ruifang</i>	543
Study on Mechanism of Octafluorocyclobutane Plasma Polymerization on Polymer Surface <i>Ye Mu, Chen Jie, Yang Zhenhua, Hu Huizhen, Liu Guizhen, Chen Chuanzheng</i>	548

4. Etching and Deposition

Characterization of Magnetron Deposited Bond Coatings <i>L.Kalivoda, R.Novák, J.Čermák, V.Strnad</i>	553
D.C. Reactive Magnetron Deposition of Titanium Nitride Films <i>J.Musil, J.Vyskočil</i>	556
Etching and Deposition Phenomena in RF Methane Plasma <i>Zdzisław Haś, Leszek Klimek, Stanisław Mitura</i>	564
Fast, Nonisothermal, High-ionized Plasma Pack—Its Physico-chemical Structure and Technical Application for the Deposition of Diamond Layers <i>A.Sokolowska, J.Walkowicz, A.Olszyna</i>	572
Improved Planar Magnetron Cathode: I. Higher Target Utilization and Less Tendency Towards Target Contamination <i>J.Kieser, R.Kukla, M.Geisler</i>	578
Improved Planar Magnetron Cathode: II. Towards the Physical Limits of High Rate Sputtering <i>M.Geisler, R.Kukla, J.Kieser</i>	584
Mass spectroscopic Study of Silane-Methane Glow Discharges <i>H.A.Weakliem, M.Akhtar</i>	589
On the Application of the Ion Plated Tribology <i>Zhang Shixing</i>	590
Property of PECVD Silicon Nitride From <2% Silane Process <i>Pei-Ching Li</i>	596
Research on the Composition Morphology and Structure of Magnetron-Sputtering Ionplated Metals and study of the Plasma Field <i>Chen Baoqing, Wang Feijie, Zhu Yingchen, Wang Yukui, Wang Xiaogang, Niu Tieyong, Wang Jiaxang, Chen Lily, Han Huemin</i>	603
Research on the Phases of the Magnetron Sputtering Ion Plating Aluminum Film on the Matrix of A3 Steel <i>Wang Yukui, Chen Baoqing, Wang Feijie, Zhu Yingchen, Yu-Guanghua, Xue Chun, Han Huimin</i>	610
Scrubbing of Toxic Halocarbons from Plasmachemical Reactors <i>H.-J.Tiller, D.Berg</i>	617
*Investigation of Dry Etching in SF ₆ and CF ₄ Beam-plasma Discharge <i>Nasedkin Yu. F., Levadnyj G. B., Serov A. A., Sereda Yu. V., Kaspruk V. Yu., Timergaliev P. Sh., Tsarev G. G.</i>	622
*On Theory of Instabilities in Low-Temperature Rotating Plasma <i>Kurko O. V., Popkov N. G.</i>	623
*On theory of Rotating Low-Temperature Plasma Instabilities <i>Kurko O. V., Popkov N. G.</i>	624
*Study of Beam-Plasma Discharge in Chemically Active Gases <i>Atamanov V. M., Nasedkin Yu. F., Levadnyj G. B., Serov A. A., Kaspruk V. Yu., Korukov A. N., Sereda Yu. V.</i>	629