

CONTENTS

Part I Symposium: From Benzene to Graphite and to Diamond

| | Page |
|---|------|
| On Some Electronic Properties of Large Aromatic Systems—B. Pullman..... | 3 |
| Ionization Energy and Electron Affinity: Benzene to Graphite—F. A. Matsen | 21 |
| Benzene to Graphite—The Change in Electronic Energy Levels—C. A. Coulson, L. J. Schaad and L. Burnelle..... | 27 |
| A Study of the Magnetism and Structure of Carbon Blacks—A. Pacault and A. Marchand | 37 |
| Le Diamagnétisme du Benzène—A. Pacault, J. Hoarau, J. Joussot-Duhien, B. Leman-ceau et N. Lumbroso | 43 |
| Semiconductive Properties of Polycyclic Aromatic Compounds—H. Akamatu and H. Iuokuchi | 51 |
| Comparisons Between Perfect Graphite and Identifiable Aromatic Molecules—A. R. Ubbelohde..... | 63 |
| A Physico-Chemical Study of the Carbonization of Hexamine—C. J. J. Baraniecki and H. L. Riley..... | 69 |
| Diamonds—H. T. Hall | 75 |

Part II Electronic Properties (from Benzene to Graphite)

| | |
|--|-----|
| Photoconductance in Single Crystals of Naphthalene, Anthracene, Tetracene, Phenanthrene, 1, 2-Benzanthracene, 1, 2, 5, 6-Dibenz-Anthracene., Biphenyl, p-Terphenyl, Pyrene and Chrysene—L. E. Lyons, A. Bree and G. C. Morris..... | 87 |
| The Catalytic and Electronic Properties of Semiquinone-type Complexes—D. D. Eley and K. Inokuchi | 91 |
| Electron Resonance Studies of Heat-treated Organic Compounds—D. J. E. Ingram | 93 |
| Paramagnetic Resonance in Coals and Heat-treated Organic Compounds—J. Ueherstiel and E. Erb | 103 |
| A Study of the Low-temperature Carbonization of D-Glucose Using Electron Magnetic Resonance and Infrared Absorption—T. H. Brown and J. Turkevitch | 113 |
| Electron Spin Resonance in Charred Sucrose—L. S. Singer, W. J. Spry and W. H. Smith | 121 |
| Paramagnetic Resonance Absorption in Heat-treated Carbon Blacks—J. G. Castle, Jr. and D. C. Wobschall..... | 129 |
| Electron Spin Resonance in Heat-treated Nine-ring Compounds—H. Akamatu, S. Mrozowski and D. Wobschall | 135 |
| Magnetic Studies of Graphites and Mesomorphous Carbons—A. F. Adamson and H. E. Blayden..... | 147 |

| | <i>Page</i> |
|--|-------------|
| The Change of Magnetic Properties in Carbonization and Graphitization of Coal—H. Honda | 159 |
| Changes in the Magnetic Susceptibility with the Degree of Carbonization—P. Kiive and S. Mrozowski | 165 |
| A Calculation of the Energy Bands of the Graphite Crystal by Means of the Tight-Binding Method—F. J. Corbato | 173 |
| Band Structure and Magnetic Properties of Graphite—J. W. McClure | 179 |
| The Electric and Magnetic Properties of Graphite—R. R. Haering and P. R. Wallace .. | 183 |
| Cyclotron Resonance in Graphite (Experimental)—J. K. Galt, W. A. Yager and F. R. Merritt..... | 193 |
| Cyclotron Resonance in Graphite—P. Nozieres | 197 |
| Magnetic Field Dependence of the Hall Effect and Magnetoresistance of Graphite Single Crystals—D. E. Soule..... | 203 |
| Electronic Properties of Heat-treated Carbon Blacks—S. Mrozowski, A. Chaberski, E. E. Loebner and H. T. Pinnick..... | 211 |
| Optical Properties of Graphite and Coal—J. T. McCartney and S. Ergun | 223 |

Part III Reactions and Compounds

| | |
|---|-----|
| Red Carbon—L. Schmidt, H. P. Boehm and U. Hoffman | 235 |
| Surface Compounds of Carbon and their Significance for its Catalyst Efficiency—H. P. Boehm, U. Hoffmann and A. Clauss | 241 |
| About Some Influences on the Reactivity of Carbons—K. Hedden and E. Wicke | 249 |
| The Kinetics of the Reactions of Carbon Filaments with Carbon Dioxide and Water Vapor at High Temperatures and Low Pressures—F. Boulanger, X. Duval and M. Letort | 257 |
| Catalysis of Graphite Oxidation—G. Hennig | 265 |
| The Reaction of Carbon with Oxygen Atoms—J. Strelzewski and J. Turkevitch | 273 |
| Reaction of Carbon Blacks with Oxygen—C. W. Snow, D. R. Wallace, L. L. Lyon, and G. R. Crocker | 279 |
| Observations on the Reaction Between Carbon Black and Water at Low Temperatures —M. L. Studebaker | 289 |
| Functional Groups in Activated Carbon and Carbon Black with Ion- and Electron-Exchange Properties—V. A. Garten and D. E. Weiss | 295 |
| New Molecular Compounds of Graphite—R. C. Croft | 315 |
| Structure Determination of Graphite Oxide—A. Clauss | 321 |
| Electronic Properties of the Crystal Compounds of Graphite—A. R. Ubbelohde..... | 329 |
| Fixation du Brome sur les Carbones de Degré de Graphitation Variable—J. Maire et J. Mering | 337 |
| Kinetics of the Graphite-Bromine Reaction—J. G. Hooley..... | 347 |
| Interstitial Compounds of Irradiated Graphite—G. R. Hennig and G. L. Montet | 349 |

Part IV—*Graphitization and Structure*

| | |
|---|-----|
| The Ultra-Fine Capillary Structure of Carbonaceous Solids—R. L. Bond and D. H. T. Spencer..... | 357 |
| A Study of some Carbonized Coals Using New X-Ray Techniques—R. Diamond..... | 367 |
| Graphite-Like Layers in Coals and High Vacuum Distillation Products—S. Ergun..... | 377 |
| X-Ray Small-Angle Scattering by Carbon Blacks and Heat-Treated Carbons—H. Akamatu and H. Kuroda..... | 381 |
| Crystal Structural Properties of Carbon Blacks—A. E. Austin..... | 389 |
| Studies on Producing Graphitizable Carbons—J. S. Conroy, R. S. Slysh, D. B. Murphy and C. R. Kinney | 395 |
| Influence of Organic Compounds on the Formation of Gas Carbon—J. D. Frazee and R. C. Anderson | 405 |
| Carbon Formation by the Flash Illumination of Polymers—J. L. Lundberg, L. S. Nelson and M. Y. Hellman | 411 |
| Ionization and the Structure of Carbon Particles at High Temperatures—F. T. Smith.. | 419 |
| The Energy Exchange Between Cold Gas Molecules and a Hot Graphite Surface—L. Meyer and R. Gomer | 425 |
| Dislocations in Graphite Crystals—T. Tsuzuku | 433 |
| Graphite Whiskers—L. Meyer | 451 |
| Atomic Arrangement and Bonding Across a Twinning Plane in Graphite—J. R. Platt .. | 459 |
| Production of Graphite Single Crystals by the Thermal Decomposition of Aluminium Carbide—L. M. Foster, G. Long and H. C. Stumpf | 461 |
| Remarques sur la Graphitabilité de Certains Charbons Agglomérés—R. Baroin | 463 |
| Influence de Certains Catalyseurs de Graphitation sur les Propriétés du Graphite, en Particulier, sur les Conductibilités Electriques et Thermiques—P. Albert et J. Parisot | 467 |
| X-Ray Diffraction Studies of Irradiated and Ground Graphites—C. E. Bacon..... | 475 |
| Fine Grinding of Ceylon Natural Graphite—P. L. Walker Jr., and S. B. Seeley | 481 |
| Studies of Carbon Powders under Compression I—S. Mrozowski | 495 |

Part V *Mechanical and Thermal Properties and Carbon Technology*

| | |
|--|-----|
| Lattice Vibrations and Low Temperature Thermal Properties of Graphite—J. A. Krumhansl | 511 |
| Thermal Properties of Graphite—J. E. Hove..... | 515 |
| High-Temperature Tensile-Properties of Graphites—H. E. Martens, L. D. Jaffe and J. E. Jepson | 529 |
| Heat-Flux-Rupture Limits with Internal Heat Generation of Several Graphites up to 5000° Fahrenheit—W. B. Powell and P. E. Massier..... | 543 |
| The Effects of Irradiation on the Mechanical Properties of Graphite—J. H. W. Simmons | 559 |
| Effect of Pile Radiation on Mechanical and other Properties of Graphite—R. A. Meyer and R. G. Bourdeau | 569 |

CONTENTS

| | <i>Page</i> |
|--|-------------|
| The Micropore Structure of Neutron Irradiated Graphite—C. N. Spalaris..... | 575 |
| Distribution of Radiation Damage in Graphite—R. E. Nightingale and W. A. Snyder.. | 579 |
| Annealing of Crystal Distortion in Irradiated Graphite—A. E. Austin and R. J. Harrison | 585 |
| Determination of X-Ray Absorption Coefficients of Inhomogeneous Carbonaceous Materials—S. Ergun and V. H. Tiensuu | 607 |
| X-Ray Absorption Analysis of Chemicals in Carbon Brushes—A. C. Titus | 613 |
| Magnetic Susceptibilities and Thermal Expansion of Artificial Graphites—P. Cornuault, A. Herpin, H. Hering and M. Seguin..... | 627 |
| Effect of Impregnation and Subsequent Burn-off on Physical Properties of Graphitized Carbon Rods—P. L. Walker, Jr. and F. Rusinko, Jr. | 633 |
| Effect of Different Cokes on Physical Properties of Graphitized Carbon Plates—P. L. Walker, Jr., F. Rusinko, Jr., J. F. Rakowski and L. M. Liggett | 643 |
| Thermal Expansion of Polycrystalline Carbons and Graphites II—F. M. Collins..... | 659 |
| Electrical Resistivities and Crushing Strengths of Baked Carbons—E. J. Seldin..... | 675 |
| Permeabilities of Raked Carbons and Beds of Carbon Powders to the Flow of a Gas— E. J. Seldin and S. Mrozowski | 687 |
| | |
| AUTHOR INDEX | 705 |
| SUBJECT INDEX | 713 |