Scientific Papers of

C V RAMAN

Volume V

PHYSICS OF CRYSTALS

Edited by

S Ramaseshan

INDIAN ACADEMY OF SCIENCES
BANGALORE
1988
# TABLE OF CONTENTS

1. Acknowledgements .............................. vii
2. Introduction .................................. ix
3. Contents ...................................... xvii
4. The papers .................................... 1–812
5. Index to co-authors .......................... 813
6. Subject index .................................. 813
7. Name index ..................................... 816
8. Papers published from C V Raman’s laboratory on the subjects covered in this volume
   a) list of papers ............................... 819
   b) author index ............................... 831
9. Consolidated list of C V Raman’s scientific papers—
   Volumes I–VI ................................. 833
3. Optics of Minerals

262. The optical anisotropy and heterogeneity of vitreous silica [1950 Proc. Indian Acad. Sci. A31 141]


265. The smoky quartz [1921 Nature (London) 108 81]

266. The structure of amethyst quartz and the origin of its pleochroism [1954 Proc. Indian Acad. Sci. A40 188; with A Jayaraman]

267. The birefringence patterns of crystal sphere [1956 Proc. Indian Acad. Sci. A43 1]


270. On the optical behaviour of crypto-crystalline quartz [1954 Proc. Indian Acad. Sci. A41 1; with A Jayaraman]


274. The luminescence of fluorite [1962 Curr. Sci. 31 361]

275. The two species of fluorite [1962 Curr. Sci. 31 445]

Volume V. Crystal Physics

1. Diffuse X-ray Reflections

292. A new X-ray effect [1940 Curr. Sci. 9 165; with P Nilakanthan]


298. The two types of X-ray reflection in crystals [1940 Proc. Indian Acad. Sci. A12 427]


2. Dynamics of Crystal Lattices

307. New paths in crystal physics [1947Curr. Sci. 16 67]
314. The infra-red spectrum [1947 Curr. Sci. 16 359]
315. The dehydrogenation of crystal structures [1948 Curr. Sci. 17 1]
316. The scattering of light in crystals and the nature of their vibration spectra [1951 Proc. Indian Acad. Sci. A34 61]
317. The vibration spectra of crystals and the theory of their specific heats [1951 Proc. Indian Acad. Sci. A34 141]

3. Elasticity of Crystals

318. The elasticity of crystals [1955 Curr. Sci. 24 325]

4. Vibrational and Thermal Energy of Crystals

323. The thermal energy of crystals [1955 Curr. Sci. 24 357]
324. Quantum theory and crystal physics [1956 Curr. Sci. 25 377]

343. The infra-red behaviour of diamond [1962 Curr. Sci. 31 403]
347. The specific heats of crystalline solids: Part II [1957 Curr. Sci. 26 231]
CONSOLIDATED LIST


2. Dynamics of Crystal Lattices
307. New paths in crystal physics [1947 Curr. Sci. 16 67]
314. The infra-red spectrum [1947 Curr. Sci. 16 359]
315. The eigenvariations of crystal structures [1948 Curr. Sci. 17 1]
316. The scattering of light in crystals and the nature of their vibration spectra [1951 Proc. Indian Acad. Sci. A34 61]
317. The vibration spectra of crystals and the theory of their specific heats [1951 Proc. Indian Acad. Sci. A34 141]

3. Elasticity of Crystals
318. The elasticity of crystals [1955 Curr. Sci. 24 325]

4. Vibrational and Thermal Energy of Crystals
323. The thermal energy of crystals [1955 Curr. Sci. 24 357]
324. Quantum theory and crystal physics [1956 Curr. Sci. 25 377]

CONSOLIDATED LIST

343. The infra-red behaviour of diamond [1962 Curr. Sci. 31 403]
347. The specific heats of crystalline solids: Part II [1957 Curr. Sci. 26 231]

355. PART II. THE RESULTS OF EXPERIMENTAL STUDY 205

354. PART III. DYNAMICAL THEORY 223

353. PART III. COMPARISON OF THEORY AND EXPERIMENT 233

356. PART IV. EVALUATION OF ITS SPECIFIC HEAT 244


358. PART I. THE STRUCTURE AND ITS FREE VIBRATIONS 233

359. PART II. ITS INFRARED ACTIVITY 256

360. PART III. THE SPECTRUM OF LIGHT SCATTERING 281

361. PART IV. SPECIFIC HEAT AND SPECTRAL FREQUENCIES 294


364. PART I. INTRODUCTION 1

365. PART II. THE FREE MOLES OF ATOMIC VIBRATION 6

366. PART III. THE INTERATOMIC FORCES 11

367. PART IV. THE EQUATIONS OF MOTION 15

368. PART V. THE EVALUATION OF THE FREQUENCIES 20

369. PART VI. THE ATOMIC VIBRATION SPECTRA 25

370. PART VII. EVALUATION OF THE SPECIFIC HEATS 30

371. PART VIII. THEIR INFRARED ACTIVITY 34

372. PART IX. SPECTRAL SHIFTS IN LIGHT SCATTERING 40

373. PART X. THE LITHIUM SALTS 45

374. PART XI. THE SODIUM SALT 52

375. PART XII. THE POTASSIUM AND POTASSIUM SALTS 60


377. THE INFRARED BEHAVIOUR OF SODIUM FLUORIDE [1963 Curr. Sci. 32 1]


379. PART I. INTRODUCTION 291

380. PART II. THE FREE MOLES OF VIBRATION 294

381. PART III. ACTIVITY OF THE NORMAL MOLES 301

382. PART IV. THE SPECTROPHOTOMETER RECORD 304
