

Table of Contents

1. Introduction	1
1.1 What are Polaritons?	1
1.2 The Raman Effect	2
1.3 Different Causes of the Raman Effect	7
1.4 Resonance Raman Effect	9
1.5 Nonlinear Raman Effects	10
2. Raman Scattering by Optical Phonons	13
2.1 The Phonon Wave-Vector	13
2.2 Observation of Optical Phonons by Raman Scattering	15
2.3 Factor Groups Analysis	15
2.4 Character Tables of the Point Groups	16
2.5 Selection Rules	20
2.6 The Raman Tensor	35
3. Dispersion of Polar Optical Modes in Cubic Diatomic Crystals	41
3.1 Huangs' Equations	41
3.2 The Retardation Effect	45
3.3 Dispersion of Polar Phonon Modes in the Polariton Region	47
3.4 Energy Density and Polaritons in Magnetic Materials ...	52
4. Dispersion of Polar Optical Modes in Polyatomic General Crystals	55
4.1 Fundamental Equations of the Polariton Theory	55
4.2 The Macroscopic Theory and Fresnels' Equation of the Wave Normal	57
4.3 Polaritons in Cubic Crystals	62
4.4 Polaritons in Uniaxial Crystals	69
4.5 Experimental Arrangements	72
4.6 Directional Dispersion of Extraordinary Phonons in Uniaxial Crystals (Oblique Phonons)	78

4.7	Extraordinary Polaritons in Uniaxial Crystals (Oblique Polaritons)	91
4.8	Ordinary Polaritons and Parametric Luminescence in Uniaxial Crystals	106
4.9	Polaritons in Biaxial Crystals	117
4.10	Damping of Polaritons	126
4.11	Polariton Eigenvectors	136
4.12	Polariton Scattering Intensities	139
4.13	The Microscopic Theory	144
4.14	Polaritons as Particles	151
5.	Some Special Topics Relative to Polaritons	161
5.1	Stimulated Raman Scattering by Polaritons	161
5.2	Polariton-Plasmon Coupling	175
5.3	On the Observation of Bulk Polaritons by TM Reflection	178
5.4	Surface Polaritons	182
5.5	Polariton Interaction with Localized Modes, Second-Order Phonons and Soft Modes	188
Appendix 1	The Ewald Method	193
Appendix 2	The Microscopic Treatment by Pick	197
Appendix 3	The Response Function Treatment by Barker and Loudon	201
Appendix 4	Raman Tensor Tables for the 32 Crystal Classes ...	204
References	212
Author Index	229
Subject Index	235