

# List of Figures

Fig. 2.1	Total fields/scattered field of the 2-D problem space.....	22
Fig. 3.1	The sample of periodic layer.....	26
Fig. 3.2	Transmission spectrum of 1-D PCs.....	26
Fig. 3.3	Dispersion relation of 1-D photonic crystal.....	27
Fig. 3.4	The sample of periodic layered media with a defect.....	28
Fig. 3.5	Transmission spectrum of air defect.....	29
Fig. 3.6	Transmission spectrum of dielectric defect.....	29
Fig. 3.7	Electric field distribution of 1-D photonic crystal.....	30
Fig. 3.8	Electric field distribution in the frequency of photonic band gap.....	30
Fig. 3.9	The real part and imaginary part of wave vector.....	31
Fig. 3.10	Comparing the imaginary part of the wave vector of FDTD and TMM.....	31
Fig. 3.11	The distribution of electric field in 2-D PCs.....	32
Fig. 3.12	Eigenfrequencies of the localized modes.....	32
Fig. 3.13	Effective dielectric constant of photonic crystals.....	33
Fig. 3.14	The relationship between $\epsilon^2$ and $s$ at dielectric band edge in one-band model..	34
Fig. 3.15	The relationship between $\epsilon^2$ and $s$ at air band edge in one-band model.....	34
Fig. 3.16	The relationship between $\epsilon^2$ and $s$ at dielectric band edge in two-band model..	35
Fig. 3.17	The relationship between $\epsilon^2$ and $s$ at air band edge in two-band mode.....	35
Fig. 3.18	The potential diagram of dielectric defect.....	36
Fig. 3.19	The potential diagram of air defect.....	37
Fig. 3.20	The potential diagram of air defect (2 band).....	38
Fig. 3.21	Simulation result of the 1-D PCs with defect by K.P theory and TMM.....	38
Fig. 3.22	1-D heterostructure.....	39

Fig. 3.22	Defect mode frequency of heterostructure.....	40
Fig. 3.23	Structure of combining two different PCs with defect.....	41
Fig. 3.24	The frequency of localized defect mode in air defect and dielectric defect.....	42
Fig. 3.25	The common band gap and the dispersion relation.....	42
Fig. 3.26	The electric field distribution in PCs.....	42
Fig. 3.27	The simulation result of the electric decay rate.....	43
Fig. 3.28	2-D heterostructure PCs.....	44
Fig. 3.29	Dispersion relation of 2-D perfect PCs in TM wave.....	45
Fig. 3.30	Simulation results calculated by K.P theory and MPB.....	47