List of Figures

Fig. 1.1 perovskite structure							
Fig. 1.2 ABO ₃ structure							
Fig. 1.3 Phases of BaTiO ₃							
Fig. 1.4 Energy level of rare-earth ions							
Fig. 2.1 Diffraction of x-ray							
Fig 2.2 Equivalence of a second-order (100) reflection and							
the first-order (200) reflection	10						
Fig. 2.3 Diagram of dipole moment	11						
Fig. 2.4 Energy diagram of IR absorption							
Fig. 2.5 4 <i>f</i> energy levels in the PL of PLT: Er^{+3} thin films	18						
Fig. 3.1 Flowchart of Er-doped PLT solution obtained by sol-gel							
method	24						
Fig. 3.2 Flowchart of sol-gel derived Er-doped PLT thin films	25						
Fig. 3.3 Setup of Raman and visible-PL measurement	26						
Fig. 4.1 XRD patterns of $Pb_xSr_{1-x}TiO_3$ samples with various x values	28						
Fig.4.2 The variation of the FWHM of the (101) peak of $Pb_xLa_{1-x}TiO_3$	28						

Fig. 4.3 Lattice constants "a" and "c" and corresponding c/a ratio of
$Pb_{x}La_{1-x}TiO_{3}29$
Fig. 4.4 Raman spectra of Pb _{1-x} La _x TiO ₃ Thin films at room
temperature
Fig. 4.5 Fitting results of experiment spectrum without disorder and with disorder
Fig. 4.6 The intensity of disorder induced background of $Pb_xSr_{1-x}TiO_3$
sample with different La concentrations
Fig. 4.7 Raman spectra of PT thin films deposited on $Pt/TiO_2/SiO_2/Si$
substrates with different thicknesses
Fig. 4.8 X-dependent phonon modes of $Pb_{1-x}La_xTiO_3$ thin film
frequencies for $Pb_xSr_{1-x}TiO_3$ and $Pb_xLa_{1-x}TiO_3$ systems in
tetragonal phase
Fig. 4.10 XRD patterns of the Er-doped Pb _{0.8} La _{0.2} TiO ₃ thin films sintered
at various temperatures with various Er doping concentrations at
700°C
Fig. 4.11 Room temperature photoluminescence spectra from
$Pb_{0.8}La_{0.2}TiO_3$ thin films doped with 1mol %, 3mol % and 5mol
% of Er under various sinteing temperatures

Fig.4.12 Dependence of the green emission intensities of PLT:Er thin

films	on Er	concentration	and s	sintering	temperature	41
111110		concentration	und b	, meeting		

