List of Figure

Figure 1.1	Light emission mechanism in phosphor and characteristic times for each transition.	5
Figure 1.2	Energy level scheme of the luminescent ion A. The excited state of ion A is indicated by *, the radiative return by R, and the nonradiative return to the ground state indicated by NR.	6
Figure 1.3	Configuration coordinate graph showing the excited state and vibrational states. The ground state (g) has the equilibrium distance.	7
Figure 1.4	Classification of types of luminescence.	10
Figure 1.5	(a) Crystal structure of simple Perovskite and (b) double perovskite (red: oxygen, green and purple: A site cation, grey and blue: BO_6 octahedra).	12
Figure 2.1	Universal steps followed for the material synthesis through hydrothermal process.	28
Figure 2.2	Area of application of hydrothermal synthesis method.	29
Figure 2.3	Steps for conventional solid state reaction route.	31
Figure 2.4	Steps for conventional solid state reaction route.	33
Figure 2.5	Bruker D8 advance x-ray diffractometer.	35
Figure 2.6	Working of modern FTIR spectrometer.	37
Figure 2.7	JASCO – 4600 Fourier Transform Infra-Red spectrometer.	38
Figure 2.8	Schematic diagram of Scanning Electron Microscope.	40
Figure 2.9	"JSM-7500F" field emission scanning electron microscope (SEM).	41
Figure 2.10	Spectrofluorometer Shimadzu RF-5301 for PL measurement.	42
Figure 3.1	Flow chart of Sr ₂ CeNbO ₆ synthesis method.	52
Figure 3.2	X-Ray Diffraction patterns of Sr ₂ CeNbO ₆ phosphors.	53
Figure 3.3	Williamson – Hall Plot of Sr ₂ CeNbO ₆ phosphors.	55
Figure 3.4	FTIR spectra of Sr ₂ CeNbO ₆ phosphors.	57

Figure 3.5	(a), (b), (c), and (d) SEM image of Sr ₂ CeNbO ₆ phosphors for 10 min., 20 min., 40 min., and 80 min. stirring time respectively.	58-59
Figure 3.6	(a) Excitation spectra of Sr_2CeNbO_6 and (b) Emission spectra of Sr_2CeNbO_6 .	60
Figure 3.7	Decomposition into sum of two Gaussian curves of different stirring time emission spectra of Sr ₂ CeNbO ₆ .	61
Figure 3.8	CIE 1931 for all Sr ₂ CeNbO ₆ phosphors.	62
Figure 4.1	Pervoskite – the maximum multifunctional structure.	71
Figure 4.2	X-Ray diffraction pattern of Eu(III) doped Sr ₂ GdNbO ₆ .	74
Figure 4.3	(a-e) Williomson-Hall plot of Eu(III) doped Sr ₂ GdNbO ₆ .	76-77
Figure 4.4	FTIR spectra of Eu(III) doped Sr ₂ GdNbO ₆ .	80
Figure 4.5	Photoluminescence emission spectra of Eu(III) doped Sr_2GdNbO_6 ; (a) excitation wavelength 254nm, (b) excitation wavelength 262nm and (c) excitation wavelength 277nm.	81-82
Figure 4.6	(a-c) CIE diagram of Eu(III) doped Sr ₂ GdNbO ₆ .	84
Figure 5.1	X-Ray diffraction pattern of undoped and Eu(III) doped Ba ₂ CeNbO ₆ .	97
Figure 5.2	(a-f) Williomson-Hall plot of undoped and Eu(III) doped Ba ₂ CeNbO ₆ .	99-100
Figure 5.3	FTIR spectra of undoped and Eu(III) doped Ba ₂ CeNbO ₆ .	103
Figure 5.4	Photoluminescence spectra of Ba ₂ CeNbO ₆ .	104
Figure 5.5	Photoluminescence Excitation spectra of Eu(III) doped Ba ₂ CeNbO ₆ .	105
Figure 5.6	Photoluminescence emission spectra of Eu(III) doped Ba ₂ CeNbO ₆ ; (a) excitation wavelength 275nm and (b) excitation wavelength 466 nm.	106
Figure 5.7	CIE diagram of Eu(III) doped Ba ₂ CeNbO ₆ (a) emission at 275 nm (b) emission at 466 nm.	109

Figure 6.1	Powder X-ray diffraction pattern of (a) undoped, single doped, double doped Sr_2GdTaO_6 and (b) Eu(III), Er(III) double doped Sr_2GdTaO_6 .	123
Figure 6.2	Magnified (021) reflection peak of undoped, single doped and Eu(III), $Er(III)$ double doped Sr_2GdTaO_6 .	124
Figure 6.3	(a-g) Williamson–Hall plot of undoped, single doped and Eu(III), Er(III) double doped Sr ₂ GdTaO ₆ .	126-128
Figure 6.4	FTIR spectra of (a) undoped Sr_2GdTaO_6 and (b) single doped Sr_2GdTaO_6 and (c) Eu(III), Er(III) double doped Sr_2GdTaO_6	130
Figure 6.5	PL spectra of Sr ₂ GdTaO ₆ , Sr ₂ GdTaO ₆ : Eu (1%) and Sr ₂ GdTaO ₆ : Eu (3%).	133
Figure 6.6	Photoluminescence excitation spectra of Eu(III), Er(III) double doped Sr_2GdTaO_6 .	134
Figure 6.7	Photoluminescence spectra of Eu(III), Er(III) double doped Sr_2GdTaO_6 of excitation wavelength (a) 265nm and (b) 276nm.	135
Figure 6.8	Energy level diagram of Eu(III), Er(III) double doped Sr ₂ GdTaO ₆ .	139
Figure 6.9	CIE diagram of phosphor excited at (a) 265nm and (b) 276nm for fixed Eu^{3+} content of 1.0mol% and Er^{3+} : (1) 0.5mol%; (2) 1.0 mol%; (3) 1.5 mol%; (4) 2.0 mol%.	141