List of Tables

**Table 1.1** List of Glass formers, Modifiers and Intermediates 6
**Table 1.2** Comparison of glass versus crystal as laser hosts 11
**Table 1.3** Electronic configuration of lanthanides 16
**Table 1.4** Hypersensitive transitions in RE$^{3+}$ ions 23
**Table 1.5** Properties of europium, dysprosium and samarium lanthanides 25

**Table 2.1** Physical properties for TLKZnFEu glasses 37
**Table 2.2** Energies for TLKZnFEu10 glass ($\nu_c$) and aquo-ion ($\nu_a$) along with nephelauxetic ratio ($\beta$) and bonding parameter ($\delta$) 43
**Table 2.3** Experimental and calculated values of oscillator strengths for TLKZnFEu10 glass 44
**Table 2.4** Comparison of $\Omega_2 (\times 10^{-20} \text{ cm}^2)$ parameters of TLKZnFEu10 glass with previously reported glasses 45
**Table 2.5** Calculated radiative parameters of TLKZnFEu10 glass 47
**Table 2.6** Observed stimulated emission cross-sections and branching ratios of TLKZnFEu10 glass 52
**Table 2.7** The electron-phonon coupling strength ($g$), the host dependent parameter ($\alpha$) and the relative decay rate for $^5\text{D}_1 (J = 1, 2 \text{ and } 3)$ levels of Eu$^{3+}$ ion in TLKZnFEu10 glass 56

**Table 3.1** Power-law parameters for Eu$^{3+}$-doped TLKZnF glasses 75
**Table 3.2** Cole-Cole parameters for Eu$^{4+}$-doped TLKZnF glasses 79
List of Tables

**Table 4.1**  Physical properties for TLKZnFDy glasses  87

**Table 4.2**  Energies for Dy$^{3+}$: TLKZnFDy10 glass ($\nu_e$) and aquo-ion ($\nu_a$) along with nephelauxetic ratio ($\beta$) and bonding parameter ($\delta$)  89

**Table 4.3**  Oscillator strengths and JO parameters for TLKZnFDy10 glass  91

**Table 4.4**  Comparison of $\Omega_\lambda$ ($\times 10^{-20}$ cm$^2$) parameters with previously reported values  92

**Table 4.5**  Calculated radiative parameters of TLKZnFDy10 glass  94

**Table 4.6**  Observed stimulated emission cross-sections and branching ratios for TLKZnFDy10 glass  96

**Table 5.1**  Physical properties for TLKZnFSm glasses  107

**Table 5.2**  Energies for TLKZnFSm10 glass ($\nu_e$) and aquo-ion ($\nu_a$) along with nephelauxetic ratio ($\beta$) and bonding parameter ($\delta$)  110

**Table 5.3**  Oscillator strengths and JO parameters for TLKZnFSm10 glass  112

**Table 5.4**  Comparison of $\Omega_\lambda$ ($\times 10^{-20}$ cm$^2$) parameters of TLKZnFSm10 glass with previously reported glasses  113

**Table 5.5**  Calculated radiative parameters of TLKZnFSm10 glass  115

**Table 5.6**  Observed stimulated emission cross-sections and branching ratios for TLKZnFSm10 glass  117