

LIST OF FIGURES

FIG. NO.	TITLE	PAGE
1.1	Schematic representation of ferroelectric hysteresis loop.	4
1.2	Schematic representation of frequency dependence of the several contribution to the total polarizability.	19
1.3(a)	Schematic representation of the free energy as function of polarization for various values of $\chi$ for a second-order transition.	26
1.3(b)	Schematic representation of the spontaneous polarization and reciprocal susceptibility near the transition temperature $T_C$ , for the second order transition.	26
1.4(a)	Schematic representation of the free energy as a function for various values of $\chi$ for a first order transition.	29
1.4(b)	Schematic representation of the spontaneous polarization and reciprocal susceptibility near the transition temperature $T_C$ , for the first order transition.	29
2.1	Cubic perovskite type structure $\text{KNbO}_3$ .	44
2.2	Structure of tetragonal $\text{KNbO}_3$ .	45

FIG. NO.	TITLE	PAGE
2.3	Structure of orthorhombic $\text{KNbO}_3$ .	46
2.4	The compositional variation of the lattice parameter $a$ , $b$ , $c$ with the impurities.	51
2.5	X-ray diffraction pattern of $\text{KNbO}_3$ .	52
2.6	X-ray diffraction pattern of $\text{K}(\text{Ni}_{0.02} \text{Fe}_{0.02} \text{Nb}_{0.96})\text{O}_3$ .	53
2.7	X-ray diffraction pattern of $\text{K}(\text{Ni}_{0.05} \text{Fe}_{0.05} \text{Nb}_{0.90})\text{O}_3$ .	54
2.8	X-ray diffraction pattern of $\text{K}(\text{Ni}_{0.10} \text{Fe}_{0.10} \text{Nb}_{0.80})\text{O}_3$ .	55
2.9	X-ray diffraction pattern of $\text{K}(\text{Ni}_{0.15} \text{Fe}_{0.15} \text{Nb}_{0.70})\text{O}_3$ .	56
3.1	Modified form of Sawyer and Tower circuit for the display of the hysteresis loop.	60
3.2	Ferroelectric hysteresis loop of $\text{KNbO}_3$ at different temperatures.	63
3.3	Ferroelectric hysteresis loop of $\text{K}(\text{Ni}_{0.02} \text{Fe}_{0.02} \text{Nb}_{0.96})\text{O}_3$ at different temperatures.	64
3.4	Ferroelectric hysteresis loop of $\text{K}(\text{Ni}_{0.05} \text{Fe}_{0.05} \text{Nb}_{0.90})\text{O}_3$ at different temperatures.	65

FIG.NO.	TITLE	PAGE
3.5	Ferroelectric hysteresis loop of $K(\text{Ni}_{0.10} \text{Fe}_{0.10} \text{Nb}_{0.80})\text{O}_3$ at different temperatures.	66
3.6	Ferroelectric hysteresis loop of $K(\text{Ni}_{0.15} \text{Fe}_{0.15} \text{Nb}_{0.70})\text{O}_3$ at different temperatures.	67
3.7	The variation of coercive field with temperature in $\text{KNbO}_3$ .	68
3.8	The variation of coercive field with temperature in $K(\text{Ni}_{0.02} \text{Fe}_{0.02} \text{Nb}_{0.96})\text{O}_3$ .	69
3.9	The variation of coercive field with temperature in $K(\text{Ni}_{0.05} \text{Fe}_{0.05} \text{Nb}_{0.90})\text{O}_3$ .	70
3.10	The variation of coercive field with temperature in $K(\text{Ni}_{0.10} \text{Fe}_{0.10} \text{Nb}_{0.80})\text{O}_3$ .	71
3.11	The variation of coercive field with temperature in $K(\text{Ni}_{0.15} \text{Fe}_{0.15} \text{Nb}_{0.70})\text{O}_3$ .	72
4.1	Schematic diagram of apparatus for the measurement of dielectric constant.	78
4.2	The variation of dielectric constant with temperature in $\text{KNbO}_3$ .	80
4.3	The variation of dielectric constant with temperature in $K(\text{Ni}_{0.02} \text{Fe}_{0.02} \text{Nb}_{0.96})\text{O}_3$ .	81

FIG. NO.	TITLE	PAGE
4.4	The variation of dielectric constant with temperature in $K(Ni_{0.05} Fe_{0.05} Nb_{0.90})O_3$ .	82
4.5	The variation of dielectric constant with temperature in $K(Ni_{0.10} Fe_{0.10} Nb_{0.80})O_3$ .	83
4.6	The variation of dielectric constant with temperature in $K(Ni_{0.15} Fe_{0.15} Nb_{0.70})O_3$ .	84
5.1	A schematic circuit diagram for the measurement of d.c. conductivity.	90
5.2	Plot of current density versus applied electric field $KNbO_3$ and $K(Ni_{0.05} Fe_{0.05} Nb_{0.90})O_3$ at constant temperature $348^\circ k$ .	91
5.3	Plot of $\log\sigma$ vs $1/T \times 10^3$ for $KNbO_3$ .	93
5.4	Plot of $\log\sigma$ vs $1/T \times 10^3$ for $K(Ni_{0.02} Fe_{0.02} Nb_{0.96})O_3$ .	94
5.5	Plot of $\log\sigma$ vs $1/T \times 10^3$ for $K(Ni_{0.05} Fe_{0.05} Nb_{0.90})O_3$ .	95
5.6	Plot of $\log\sigma$ vs $1/T \times 10^3$ for $K(Ni_{0.10} Fe_{0.10} Nb_{0.80})O_3$ .	96
5.7	Plot of $\log\sigma$ vs $1/T \times 10^3$ for $K(Ni_{0.15} Fe_{0.15} Nb_{0.70})O_3$ .	97

FIG. NO.	TITLE	PAGE
5.8	Plot of $\log \sigma$ of $\text{KNbO}_3$ as a function of $\log t$ at $473^\circ\text{k}$ below curie temperature.	98
5.9	Plot of $\log \sigma$ of $\text{KNbO}_3$ as a function of $\log t$ at $523^\circ\text{k}$ above curie temperature.	99
5.10	Plot of $\log \sigma$ of $\text{KNbO}_3$ as a function of $\log t$ at $710^\circ\text{k}$ above curie temperature.	100
5.11	Plot of $\log \sigma$ of $\text{K}(\text{Ni}_{0.15} \text{Fe}_{0.15} \text{Nb}_{0.70})\text{O}_3$ as a function of $\log t$ at $523^\circ\text{k}$ below curie temperature.	101
5.12	Plot of $\log \sigma$ of $\text{K}(\text{Ni}_{0.15} \text{Fe}_{0.15} \text{Nb}_{0.70})\text{O}_3$ as a function of $\log t$ at $573^\circ\text{k}$ above curie temperature.	102
6.1	Experimental set-up for the measurement of thermoelectric power.	108
6.2	The variation of thermoelectric power with temperature in $\text{KNbO}_3$ .	110
6.3	The variation of thermoelectric power with temperature in $\text{K}(\text{Ni}_{0.02} \text{Fe}_{0.02} \text{Nb}_{0.96})\text{O}_3$ .	111
6.4	The variation of thermoelectric power with temperature in $\text{K}(\text{Ni}_{0.05} \text{Fe}_{0.05} \text{Nb}_{0.90})\text{O}_3$ .	112
6.5	The variation of thermoelectric power with temperature in $\text{K}(\text{Ni}_{0.10} \text{Fe}_{0.10} \text{Nb}_{0.80})\text{O}_3$ .	113
6.6	The variation of thermoelectric power with temperature in $\text{K}(\text{Ni}_{0.15} \text{Fe}_{0.15} \text{Nb}_{0.70})\text{O}_3$ .	114