

Contents

1.	Introduction	1
	References	11
2.	Theoretical considerations	
2.1	Introduction	15
2.2	Mossbauer Effect	15
2.3	Principle of Mossbauer effect	16
2.4	Mossbauer parameters	20
2.5	Isomer shift	22
2.6	Second order Doppler shift	25
2.7	Quadrupole Splitting	26
2.8	Magnetic Splitting	27
2.9	Line shape and Resonance Intensity	30
2.10	Parabolic Effect	31
2.11	Magnetic Properties	31
2.12	Theories of Ferromagnetism	33
2.13	Magnetic Hyperfine Interactions	36
2.14	Local Moments and Dilute Alloys	39
2.15	Brief theory of Superconductivity	43
2.15 A	Introduction	43
2.15 B	BCS Theory	46
	References	50
3.	Experimental Methodology	
3.1	Introduction	53
3.2	Mossbauer Setup	53

3.3	Velocity Calibration	60
3.4	Data Analysis	61
3.5	Neutron Depolarization Theory and Setup	62
	References	65
4.	Fe concentration dependence study of FeSb system.	
4.1	Introduction	66
4.2	Hyperfine Interaction studies at Fe-57 probe in Sb.	67
4.2.1	Sample preparation	67
4.2.2	Experimental	68
4.2.3	Result and Discussion	69
	References	95
5.	Magnetic Interaction in $Fe_xSb_{1-x-y}Se_y$ system	
5.1	Introduction	97
5.2	Sample preparation	99
5.3	Experimental	100
5.4	Result and Discussion	100
	References	127
6.	Multiple substitutions in YBCO	
6.1	Introduction	128
6.2	Experimental	134
6.3	Result and Discussion	135
6.4	Concentration dependence study of Fe doping in $LaBaCaCu_{3-x}Fe_xO_7$ system and its comparison with Re-123 systems.	152
	References	159