

Contents

Introduction	1
1 Manganites	3
1.1 General properties	3
1.2 Intrinsic electric transport	6
1.3 Extrinsic phenomena	8
2 Theories of grain boundary transport	13
2.1 Basic theory	13
2.2 Magnetotransport models	15
2.2.1 Direct tunneling	15
2.2.2 Mesoscopic magnetoresistance model	16
2.2.3 Second-order tunneling	18
3 Materials and preparation techniques	21
3.1 Materials	21
3.2 Preparation techniques	23
3.2.1 Solid state reaction route	23
3.2.2 Pulsed laser deposition	24
3.2.3 Lithography technique	25
4 Characterization techniques	27
4.1 Structural analysis	27
4.2 Magnetic measurements	28
4.3 Transport measurements	29
4.4 Application of reversible strain	32
5 Grain boundary magnetotransport	33
5.1 Bulk polycrystalline manganites	33
5.2 Step edge junctions	41
5.3 Bicrystal junction	48

5.4 Summary on <i>Grain boundary magnetotransport</i>	54
6 Grain boundary junctions on a piezoelectric substrate	55
6.1 Step edge junctions on a piezo-substrate	55
6.2 Polycrystalline films on a piezo-substrate	67
6.3 Scratch junction on a piezo-substrate	75
6.4 Summary on <i>grain boundary junctions on a piezoelectric substrates</i>	78
Conclusions and Outlook	79
References	82
Publications	93
Acknowledgements	95