

1	<i>Introduction.....</i>	<i>1</i>
1.1	Electrical interconnect and optical interconnect.....	1
1.2	State-of-Art of polymer optical interconnect.....	2
2	<i>EOCB fabrication and production.....</i>	<i>7</i>
2.1	Polysiloxane based EOCB lab fabrication.....	7
2.2	Polysiloxane based EOCB production	9
2.3	Overview about the thesis work.....	10
3	<i>Optical aspects on EOCBs</i>	<i>15</i>
3.1	Introduction.....	15
3.2	Experimental	16
3.3	Refractive index and bandwidth.....	18
3.4	Optical loss	23
3.4.1	Scattering loss	23
3.4.2	Intrinsic absorption loss by molecule vibrations	25
3.4.3	Estimation of absorption loss.....	35
3.5	Processing of PDMS optical waveguides.....	43
3.5.1	Fabrication of PDMS optical waveguides	44
3.5.2	Scattering loss from mould roughness.....	48
3.5.3	Optical loss due to interlayer	50
3.5.4	Optical loss from packaging substrates	52
3.6	Summary of results of the chapter.....	55
4	<i>Mechanical Aspects on EOCBs</i>	<i>56</i>
4.1	Introduction.....	56
4.2	Curing mechanism of PDMS materials	57

4.2.1	Hydrosilylation addition reactions in PDMS	58
4.2.2	Experimental characterization to PDMS curing	61
4.2.3	Identification of curing conditions for waveguides fabrication ...	67
4.2.4	Mechanical characterization	69
4.3	Development of SAP and substrates etching	72
4.3.1	Basic concept for Surface-Adhesion-Promoter synthesis	72
4.3.2	Identification of substrate surface molecular structures	74
4.3.3	Effect of treatments on surface roughness	83
4.3.4	Effect of treatments on surface free energies of substrates.....	85
4.3.5	Influences from hydrophobic recovery on treated PCBs.....	89
4.4	Development of EOCB fabrication based on SAPs and compatible etching method	91
4.4.1	Basic concept	90
4.4.2	Determination of SAP components and etching condition	94
4.4.3	Characterization to fabrication EOCB	96
4.5	Environmental stability of realized EOCB	102
4.5.1	Environmental accelerated testing design	102
4.5.2	Determination of simulating aging time and samples sizes	104
4.5.3	Optical stability of EOCBs.....	109
4.5.4	Mechanical stability of EOCBs.....	111

5 Conclusion and outlook..... 113

6 Liturature I

6.1	Applied lituratures	I
6.2	Own publications.....	IX