

# Table of contents

Acknowledgements .....	I
Table of contents.....	III
<b>1. Introduction .....</b>	<b>1</b>
<b>2. Background .....</b>	<b>4</b>
2.1. Electrodeposition .....	4
2.1.1. Basic concept of electrodeposition .....	5
2.1.2. Growth of electrodeposited films .....	7
2.1.3. Electrodeposition variables .....	9
2.1.4. Electrodeposition of CoNi-alloys .....	18
References.....	22
2.2. Nanocrystalline metals .....	26
2.2.1. Synthesis of nanocrystalline metals .....	27
2.2.2. General characteristics of nanocrystalline metals .....	29
References.....	32
2.3. Grain boundary structure.....	34
References.....	40
2.4. Phase transformation in Co and Co-alloys .....	41
References.....	45
2.5. Basic concepts of EBSD-based orientation microscopy .....	46
References.....	52
<b>3. Experimental details .....</b>	<b>53</b>
3.1. Electrodeposition .....	53
3.2. CoNi samples .....	54
3.3. Sample preparation .....	55
3.4. Characterization techniques .....	58
References.....	63
<b>4. Experimental results and discussion .....</b>	<b>64</b>
4.1. Microstructure.....	64
4.1.1. General description .....	64
4.1.2. Phase distribution.....	67
4.1.3. Grain size and grain size distribution .....	71
4.1.3.1. Substrate and bath interfaces of electrodeposited CoNi .....	78

---

4.1.3.2. Cross section of electrodeposited CoNi .....	85
4.1.4. Discussion.....	89
References.....	95
4.2. Crystallographic texture.....	96
4.2.1. Microtexture .....	96
4.2.2. Orientation gradient.....	100
4.2.3. Discussion.....	106
References.....	109
4.3. Grain boundary .....	110
4.3.1. Grain boundary character .....	110
4.3.2. Boundary character distribution.....	113
4.3.3. Triple junctions .....	116
4.3.4. Discussion.....	120
References.....	124
4.4. 3D-EBSD .....	125
4.4.1. Discussion.....	132
References.....	134
4.5. Dependence on the amount of saccharin .....	135
4.5.1. Microstructure .....	135
4.5.1.1. General description.....	135
4.5.1.2. Phase distribution .....	140
4.5.1.3. Grain size .....	142
4.5.2. Texture.....	148
4.5.3. Grain boundaries.....	155
4.5.4. Discussion.....	160
References.....	166
<b>5. Conclusions.....</b>	<b>167</b>
<b>Summary.....</b>	<b>174</b>
<b>Zusammenfassung .....</b>	<b>177</b>