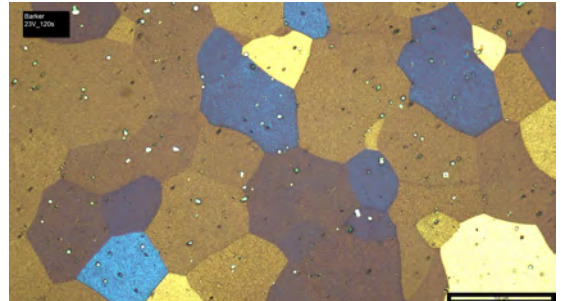

Introduction

Mechanical preparation of soft materials like Al and Mg is challenging, simply due to a characteristic response to mechanical impact. Electropolishing eliminates the risk of introducing surface deformation and therefore this is an efficient metallographic technique for materials investigation in high resolution microscopy, where any mechanical artifacts from sample preparation is unacceptable. Handling water reactive materials like magnesium also benefits from the very fast electrochemical preparation.



Material Name: Aluminium and Mg alloy

Developed by: Holger Schnarr

Date: 01.04.2016

Grinding/Polishing

Equipment: LaboPol-60

Disc diameter: 250 mm / 10"

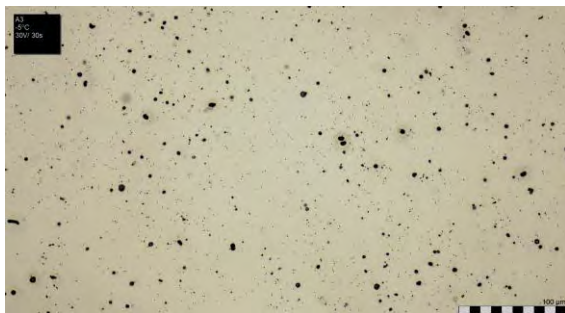
Comments: Before electrolytic preparation 2 steps of grinding were done manually.



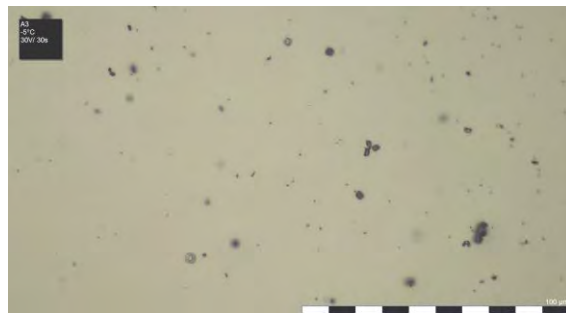
Step	1	2
 Disc / Cloth	SiC Foil #500	SiC Foil #2000
 Speed [rpm]	300	300
 Suspension		
Pre-dosing		
Dosing		
 Lubricant	Water	Water
Pre-dosing		
Dosing		
 Force [N]	/	/
Single/Holder		
 Holder speed		
Rotation direction	>>	>>
 Time [min]	0:30	0:30
Pause between steps	Nein	Nein

Electrolytical Preparation

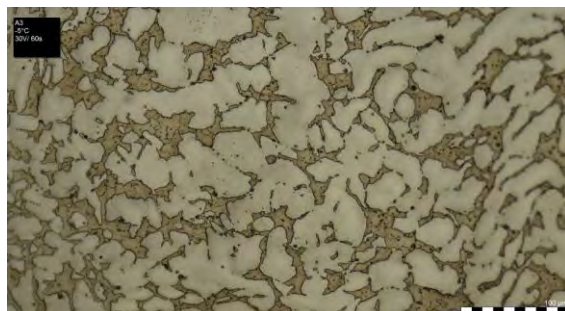
Equipment:	LectroPol-5
Polishing	
Electrolyte:	A3
Temperature:	-5...-10°C
Time:	45 s
Mask size:	5cm ²
Flow rate:	13
Voltage:	30 V
Comments:	Cooling is highly recommended below zero degrees.



Al₃Mg after electrolytic polishing



Al₃Mg after electrolytic polishing



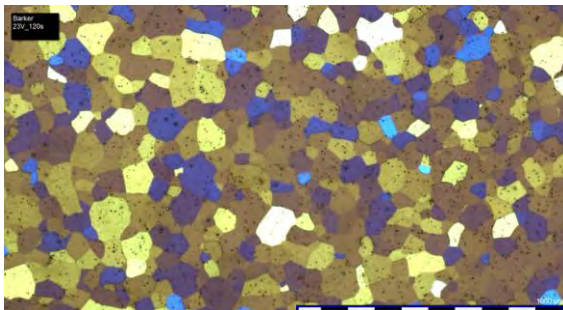
Mg with Li/ electrolytic polishing



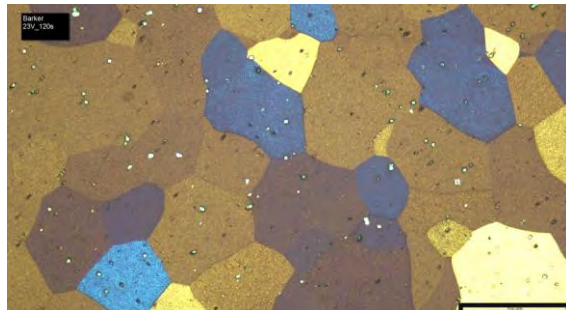
Mg with Li

Etching of AlMg samples

Equipment:	LectroPol-5
Electrolyte:	Barkers reagent
Temperature:	5°C
Time:	120 s
Mask size:	5 cm ²
Flow rate:	13
Voltage:	23 V
Comments:	



Al₃Mg after Barker etching POL



Al₃Mg after Barker etching POL

Summary

A metallographic microstructure is obtained with a very short procestime of less than 5 minutes. 2 grinding steps, electropolishing and electrochemical etch, are the elements in the proces, which also takes care of the water reactive Mg, by cleaning without water. A deformation free surface of an Mg and a Al alloy is obtained arady for analysis.