IMTEK

Master's Thesis

Title of the Thesis

Uncle Hans

UNI FREIBURG

A master's thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science of Microsystems Engineering

according to the examination regulations at the University of Freiburg for the Master's degree in Microsystems Engineering of July 20, 2001.

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Title page The title picture shows an incredibly awesome device. Feel the magic!

Declaration

according to the Examination Regulations:

I hereby confirm to have written the following thesis on my own, not having used any other sources or resources than those listed. All passages taken over literally or correspondingly from published sources have been marked accordingly. Additionally, this thesis has not been prepared or submitted for another examination, neither partially nor completely.

Freiburg, October 25, 2016

Uncle Hans

Zusammenfassung

In der vorliegenden Arbeit werden zwei grundsätzlich verschiedene Konzepte zur Realisierung einer ??? vorgestellt. Ausgehend von Vorarbeiten wurde dies und das im wesentlichen erreicht.

In einer Analyse des state-of-the-art von aaa werden zunächst verschiedene, meist aaa Funktionsprinzipien vorgestellt, bevor einige Grundlagen der aaa hergeleitet werden.

Im Anschluss daran wird die aaa detailliert diskutiert. Die aus einer ersten Versuchsreihe gewonnenen Erkenntnisse führen zur Ableitung wichtiger Design-Regeln, welche zur erfolgreichen Umsetzung eines aaa führen.

Ein weiterer Kern dieser Arbeit besteht in der Charakterisierung aller aaa. Daneben wird ein komplexer Herstellungsprozess durch Optimierung mehrerer Einzelprozessschritte entwickelt. Alle wesentlichen Prozessschritte zur Herstellung der aaa werden besprochen, wobei Lösungen für die im Prozess aufgetretenen Problemstellungen präsentiert werden.

Nach der erfolgreichen Herstellung werden die aa durch aaa optisch charakterisiert. Das dynamische Verhalten der aaa werden sowohl qualitativ als auch quantitativ untersucht. Mit der entwickelten aaa können aaa erreicht werden.

Stichwörter: a, b, c, d, e, f

Abstract

Chicken Chicken

Keywords: IMTEK, Master Thesis

Contents

Nomenclature

Latin letters

variable	meaning	unit
A	area	m^2
w	width	m
c	concentration	wt.$\%$
d	diameter	m
G	Gibbs free enthalpy	J
h	height	m
l	length	m
m	mass	kg
p	pressure	Pa
r	radius	m
Re	Reynolds-number	
t	time	s
V	volume	m^3

Greek letters

variable	meaning	unit
α	absorption coefficient	$1/\mathrm{m}$
γ	surface tension	N/m
η	dynamic viscosity	Ns/m^2
θ	contact angle	°, rad
κ	curvature	$1/\mathrm{m}$
λ	wave length	m
ν	kinematic viscosity	m^2/s
ρ	specific gravity	kg/m^3

Indices

index	meaning
lg	liquid-gas
sg	solid-gas
sl	solid-liquid
la	liquid-ambient

Abbreviations

abbreviation	meaning
2D	2-dimensional
AF	amorphous fluoropolymer
DFR	dry film resist
DI	deionized ultra-pure water
DRIE	Deep reactive ion etching
ICP	Inductive coupled plasma
MEMS	Micro-electro-mechanical system
PDMS	Polydimethylsiloxan
PEB	Post Exposure Bake
PMMA	Polymethylmethacrylat
UV-Vis	ultraviolet to visible wavelengths

1 Introduction

1.1 The History of Pulse Oximetry

... This is a test for the *icomma package* ic *PersonalSettings* : $1{,}23$ - It works !

Now a test for citing in the Chicago Style.(**?**)
Once again. (**?**)

2 Theory

Within this Chapter the most important optical basics will be discussed...

2.1 Optics

2.1.1 Optical Devices

For the detection of the light intensity ...

3 Design & Technology

...

3.1 First Section

3.1.1 First Subsection

BlablaBlablaBlablaBlablaBlablaBlablaBlaBla

3.1.2 Second Subsection

Bla2 BlablaBlablaBlablaBlabla ...

4 Simulations

4.1 Transimpedance Amplifier

To determine the behaviour of the amplifier the simulation software "PSpice 9.2" from the company Orcad was used ...

5 Measurements

Here could be an overview of the kinds of measurements that were done.

5.1 In-vitro Measurements

Donaudampfschiffkapitän Donaudampfschiffkapitän

5.2 In-vivo Measurements

To test the function of the system in an organism, measurements with a domestic pig were done. These tests were allowed by the ethnical commitee of the University Medical Center and the Ethnics Approval can be found in the Appendix...

6 Conclusion & Outlook

The main goal of this work was the realization of a ...

Design The principal idea presented here is to use a black aqueous pigment dispersion for closing an aperture stop, whereas silicone oil is used as a transparent index matching liquid. The working principle is based on capillary forces, which avoids the use of channels and

Characterization After fabrication, the aperture stops have been characterized considering the attenuation as well as the transmission and the actuation performance....

Outlook The presented optofluidic micro-iris is a low priced, compact concept, which provides several possibilities for improvement...

References

Note of Thanks

Lastly, I wish to express my gratitude to those many people, who helped me in the last six months, for their contribution to success of this Master Thesis.

I want to thank Prof. Hans Zappe and my second corrector Prof...

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