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OBSAH

SEM a AFM studie morfologie tenkých vrstev tuhého roztoku SiC-AlN *(D. Dallaeva, P. Tománek, B. Bilalov, E. Korostylev)* 75

Příprava, vlastnosti a použití safírových vláken pěstovaných metodou EFG *(M. Klejch, J. Kubát, M. Němec)*..... 78

Lokální optoelektronická diagnostika mikroskopických vad v solárním křemíkovém článku
(P. Škarvada, P. Tománek, L. Grmela, D. Dallaeva)..... 81

Měření topografie rotačně symetrických optických ploch pomocí gradientní deflektometrické metody
(A. Mikš, J. Opat)..... 85

Metoda rekonstrukce tvaru měřené optické plochy pomocí deflektometrického principu
(A. Mikš, J. Novák, J. Opat, P. Pokorný)..... 89

Experimentální dokazování kvantové fyziky
(L. Sodomka)..... 93

HANNOVER MESSE 2013..... 96

Mimořádné akce na veletrhu HANNOVER MESSE 2013..... 96

Poděkování a gratulace Paulu Rausnitzovi..... 97

Meopta slaví osmdesátiny *(Z. Veselá)*..... 98

Meopta 80: Historie optického průmyslu v Přerově
(P. Sehnálek)..... 98

Současný majitel Meopty pan Paul Rausnitz oslaví v březnu své 85. narozeniny *(Z. Veselá)*..... 98

AMPER 2013..... 100

Z technické knihovny *(L. Sodomka, I. Brezina)*..... 101

Konfokální snímače vzdálenosti měří mezery ve vícevrstvých fotovoltaických panelech..... 102

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VOLUME 58 3/2013

CONTENTS

SEM and AFM study of thin film SiC-AlN solid solution morphology *(D. Dallaeva, P. Tománek, B. Bilalov, E. Korostylev)* 75

Application of sapphire single-crystal fibers grown by the EFG method *(M. Klejch, J. Kubát, M. Němec)*..... 78

Local optoelectronic diagnostics of microscopic defects in solar silicon cells
(P. Škarvada, P. Tománek, L. Grmela, D. Dallaeva)..... 81

Topographic measurement of axially symmetric optical surfaces using gradient deflectometric method
(A. Mikš, J. Opat)..... 85

Technique for optical surface shape reconstruction using deflectometric principle
(A. Mikš, J. Novák, J. Opat, P. Pokorný)..... 89

Experimental prooving of quantum physics *(L. Sodomka)*..... 93

HANNOVER MESSE 2013..... 96

Exceptional events of fair-trade HANOVER MESSE 2013..... 96

Thanks and congratulations to Mr. Paul Rausnitz..... 97

Meopta celebrates its eighties *(Z. Veselá)*..... 98

Meopta's 80's: History of optical industry in Přerov
(P. Sehnálek)..... 98

Mr. Paul Rausnitz – current owner of Meopta – will celebrate his 85's in March *(Z. Veselá)*..... 98

AMPER 2013..... 100

From technical library *(L. Sodomka, I. Brezina)*..... 101

Confocal distance sensors can measure the gaps in the multilayer photovoltaic panels..... 102

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CONTENTS

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(D. Dallaeva, P. Tománek, B. Bilalov, E. Korostylev).....75
The paper brings results of SiC/$(SiC)_{(1-x)}(AlN)_x$ thin films manufacturing by sublimation epitaxy of the polycrystalline source of $(SiC)_{1-x}(AlN)_x$. Their characterization by scanning electron microscopy and atomic force microscopy was also provided, and optimal conditions of sublimation process were defined. These structures could be used as substrate for design of semiconductor devices on the basis of nitrides, including gallium nitride, aluminum nitride and their alloys. The results of SEM and AFM analysis showed, that the temperatures of 2300 K is sufficient to obtain aluminium nitrate thin films and also its solid solutions.
Keywords: silicon carbide, aluminum nitride, epitaxy, SEM, AFM

Application of sapphire single-crystal fibers grown by the EFG method (M. Klejch, J. Kubát, M. Němec).....78
Sapphire – the single crystal of aluminum oxide (Al_2O_3) – is one of the most important artificially produced materials. The sapphire fibres studied were grown in Crytur using the "edge-defined film-fed growth" (EFG) technique. Their unique physical and chemical properties can be employed in various applications. Due to their phenomenal resistivity, high refractive index and a broad transmission band spanning the ultraviolet, visible and infrared bands, sapphire fibres are perfect waveguides in harsh environments. The current major applications are Er:YAG laser signal delivery and pyrometric and spectrometric measurements in furnaces, combustion engines, etc. In this paper we summarize an adjustment of the EFG method to grow thin filaments by giving possible molybdenum bed die designs. We investigated the fibres using an optical microscope and measured their transmission of an Er:YAG laser beam (2.94 μm). The attenuation of the tested samples is approximately 0.1 dB/cm.

Local optoelectronic diagnostics of microscopic defects in solar silicon cells
(P. Škarvada, P. Tománek, L. Grmela, D. Dallaeva).....81
The research and design of photovoltaic solar cells play more and more significant practical role as and energy source and also in the environment protection. The present microscopic scanning technology can be successfully applied to the local diagnostics of defects in monocrystalline silicon solar cells. The proposed method combines three measurements: of electrical noise, local topography and locally induced photocurrent. To verify this method feasibility we have selected one hidden defect in the bulk and another one at the sample surface of monocrystalline silicon cell emitting the light in the reverse direction.
Keywords: silicon, solar cell, defect, local microscopy

Topographic measurement of axially symmetric optical surfaces using gradient deflectometric method (A. Mikš, J. Opat).....85
This paper describes a detailed theoretical analysis of the deflectometric gradient method for measuring the topography of rotationally symmetric and optically reflective surfaces. It is shown that the shape of the measured surface is obtained as a solution of ordinary nonlinear differential equation. The advantage of this contactless method is that it does not require any reference surface.

Technique for optical surface shape reconstruction using deflectometric principle
(A. Mikš, J. Novák, J. Opat, P. Pokorný).....89
In this work we provide a theoretical analysis of deflectometric method for 3D topography measurements of optically smooth surfaces. It is shown that the surface reconstruction problem leads to a nonlinear partial differential equation of the first order. A shape of a surface can be calculated by solution of a derived equation. An advantage of the presented method is a noncontact character and no need for a reference surface.

Experimental prooving of quantum physics (L. Sodomka) ...93

HANNOVER MESSE 2013.....96

Exceptional events of fair-trade HANOVER MESSE 2013.....96

Thanks and congratulations to Mr. Paul Rausnitz.....97

Meopta celebrates its eighties (Z. Veselá).....98

Meopta's 80's: History of optical industry in Přerov (P. Sehnálek).....98

Mr. Paul Rausnitz – current owner of Meopta – will celebrate his 85's in March (Z. Veselá).....98

AMPER 2013.....100

From technical library (L. Sodomka, I. Brezina).....101

Confocal distance sensors can measure the gaps in the multilayer photovoltaic panels.....102