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OBSAH

Konstrukce a aplikace disociačního termálního zdroje svazků atomů vodíku (J. Mach, M. Potoček, M. Kolíbal, T. Šíkola).....	163
Řízený růst kobaltových ostrůvků na křemíkovém substrátu (J. Čechal, J. Polčák, O. Tomanec, T. Šíkola).....	165
Modelování povrchových plasmonů (J. Vlček, P. Otipka, M. Lesňák)	168
Modely vývoje trhlin při mechanickém zatěžování pevných látek (P. Koktavý, B. Koktavý)	171
Matematický model aktualizace charakteristik motoru (J. Hromádko, J. Hromádko, P. Miler, V. Höning, M. Schwarzkopf).....	174
Robotizovaná pracoviště firmy ROBOTECH	178
Životné jubileum RNDr. Ing. Jána Bartla, CSc. (D. Senderáková)	179
METROLOGICKÉ VELETRHY CONTROL A SENSOR + TEST 2010 (J. Kůr)	180
Základní struktura a subsystémy radaru (J. Pospíšil, F. Pluháček).....	182
SPIE/CS – společnost optiků informuje	186
Z technické knihovny (I. Brezina)	187

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CONTENTS

Design and application of thermal dissociation atomic hydrogen source (J. Mach, M. Potoček, M. Kolíbal, T. Šíkola).....	163
Guided growth of cobalt islands on silicon substrate (J. Čechal, J. Polčák, O. Tomanec, T. Šíkola)	165
Modeling of surface plasmons (J. Vlček, P. Otipka, M. Lesňák)	168
Modelling of cracks development in solid matter under mechanical stress (P. Koktavý, B. Koktavý).....	171
Mathematical Model of Engine Characteristics Updating (J. Hromádko, J. Hromádko, P. Miler, V. Höning, M. Schwarzkopf).....	174
Robot work stations from ROBOTECH company	178
RNDr. Ing. Ján Bartl, CSc.'s life anniversary (D. Senderáková)	179
METROLOGICAL FAIR TRADES CONTROL AND SENSOR + TEST (J. Kůr).....	180
Basic structure and subsystems of a radar (J. Pospíšil, F. Pluháček).....	182
SPIE/CS – a community of optical physicists informs	186
From technical library (I. Brezina)	187

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CONTENTS

Design and application of thermal dissociation atomic hydrogen source (J. Mach, M. Potoček, M. Kolíbal, T. Šíkola)..... 163

The design and construction of a thermal dissociation source for generation of hydrogen atomic beams with thermal energy (0.1 - 1 eV) will be described. The main application areas of presented source covers: low-temperature cleaning of surfaces and ultrathin films, preparation of hydrogen passivated surfaces, and hydrogen assisted molecular beam epitaxy. The hydrogen molecules were dissociated in a tungsten capillary heated by electron bombardment. The properties (profile, dissociate) of these atomic source were measured by a quadrupole mass spectrometer in the differentially pumped chamber.

Keywords: hydrogen, thermal dissociation, atom source, atomic hydrogen beam

Guided growth of cobalt islands on silicon substrate (J. Čechal, J. Polčák, O. Tomanec, T. Šíkola)..... 165

We have presented a straightforward method for fabrication of patterns of cobalt islands. The focussed ion beam lithography has been used to locally modify a native SiO₂ layer on a silicon substrate. On the modified areas preferential nucleation of cobalt islands is observed due to a reduced surface diffusion of Co atoms in the vicinity of FIB modified areas. Using this method ordered arrays of islands with given size and positions may be prepared.

KEYWORDS: thin films, nucleation, guided growth, focussed ion beam SiO₂, cobalt

Modeling of surface plasmons (J. Vlček, P. Otipka, M. Lesňák)..... 168

The contribution is devoted to the background of surface plasmons modeling in optical multilayers. The typical characteristics of plasmon waves excited in planar and periodical structures are presented.

Modelling of cracks development in solid matter under mechanical stress (P. Koktavý, B. Koktavý)..... 171

The creation of cracks in non-conducting matter under mechanical stress is accompanied by electromagnetic field. Four ways of the crack behaviour are proposed implementing the dipole model. Supposing the use of capacitance sensors we derive the differential

equation describing the transformation of primary crack parameters to the measured electrical signal and we solve it for these four conceptions of the crack development. The theoretical and experimental results were compared from which we can determine some primary crack parameters.

Keywords: electromagnetic emission, crack, charge, model

Mathematical Model of Engine Characteristics Updating (J. Hromádko, J. Hromádko, P. Miler, V. Höning, M. Schwarzkopf)..... 174

The aim of this article is creation and check of the mathematical model of engine emission characteristics updating and of the fuel consumption characteristics, which could developed early created mathematical model of vehicle driving. By the help of characteristics updating, there would be possible to include a style of vehicle driving and even a factor, which consider an engine technical conditions to the emission production, which are set by the mathematical model of vehicle driving. In this article a possibility of characteristics updating was researched by way of three measured points and also by seven points.

Keywords: fuel consumption, harmful emission, internal combustion engine, non- road transient cycle

Robot work stations from ROBOTECH company 178

RNDr. Ing. Ján Bartl, CSc.'s life anniversary (D. Senderáková) 179

METROLOGICAL FAIR TRADES CONTROL AND SENSOR + TEST (J. Kür)..... 180

In May 2010 two important fair trades of metrology were held in the Germany. The 24th fair trade CONTROL was organised in the new exhibition centre in Stuttgart between 4-7 May 2010 and the fair trade SENSOR + TEST in the Nürnberg fair trade centre between 18-20 May 2010. At least a basic information is provided about both fair trades, metrology development trends, interesting fair goods and exhibiting firms.

Basic structure and subsystems of a radar (J. Pospíšil, F. Pluháček) 182

SPIE/CS – a community of optical physicists informs 186

From technical library (I. Brezina) 187