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Study Programmes in Nanotechnology at VŠB-Technical University of Ostrava (J. Trojčková, J. Pištora, J. Seidlerová)..... 163
VŠB - Technical University of Ostrava offers a Bachelor of Science and a Master of Science degrees in Nanotechnology since 2007. The related study programmes, their structure and academic background are introduced here.

Measurement of chromatic dispersion coefficient by a spectral interferometric method

(D. Ciprian, P. Hlubina, M. Kadulová) 168
The paper is oriented on determination of chromatic dispersion coefficient of a microstructured optical fibre using a spectral interferometric method. At first, spectral dependence of the differential group index is measured and then spectral dependence of chromatic dispersion coefficient is calculated. The derivative of the differential group index is calculated explicitly using a suitable function of approximation. Usability of polynomial and Laurent polynomial approximation is discussed. The method was verified by comparison of spectral dependence of chromatic dispersion coefficient obtained from experimental data with the spectral dependence of chromatic dispersion coefficient calculated using Sellmeier formula under the condition that the light was guided by the outer cladding of the fibre. Subsequently, the spectral dependence of chromatic dispersion coefficients of polarization modes propagating in the microstructured optical fibre was determined.

Influence of Cooper Materials Grain Size to the Surface Texture

(P. Hlaváček, J. Valíček, M. Greger, M. Kušnerová) 172
In this paper there are presented the results of experiments that have been made to the technically pure copper, in order to determine the influence of grain size on the material texture of machined surface. For the creation of fine-grained materials there was used technology of channel angular pressing. This technology is one of the methods of creating extreme plastic deformation. For the machining of fine-grained materials the technology of hydroabrasive cutting was used. Cutting walls were measured using a contact profilometer Hommel Tester T8000. The obtained results show that the grain refinement adversely affects the final texture of machined surface.

Dispersion measurement of a two-mode birefringent microstructured fibre using white-light spectral interferometry

(M. Kadulová, P. Hlubina, D. Ciprian, G. Statkiewicz-Barabach, W. Urbanczyk) 176
The results of wide spectral range dispersion measurement of a two-mode birefringent microstructured fibre are presented. A spectral interferometric method using a tandem configuration of a Michelson interferometer and a fibre under test is performed. The group modal birefringence dispersion for two linearly polarized modes supported by the fibre is examined. The measured values are fitted to polynomials to obtain the dispersion of the phase modal birefringence for both modes. It is shown that the results correspond to the

approximation of the phase modal birefringence of the fundamental mode in air-silica fibres.

Keywords: spectral interferometry, microstructured fibre, linearly polarized mode, birefringence, dispersion

Aggregates Morphology of Silicon Nanoparticles Prepared in Water Jet Mill Disintegrator (R. Dvorský, J. Luňáček, A. Slíva, K. Barabaszová, J. Seidlerová, D. Matýšek)..... 179

The paper deals with physical mechanisms of disintegration of solid particles in new device called WJM-“Water Jet Mill” and a global description of the said system includes internal milling cycles and particle size separators of a liquid suspension. A disintegration agent here is a high energy liquid jet influence with outlet velocity about $660 \text{ m}\cdot\text{s}^{-1}$ and high level of cavitation in disintegration zones. Dominate disintegration mechanism affected by cavitation bubble implosions direct on a particle surface inside a liquid suspension brings about a particle refinement to the level under 100 nm followed with a small mechanical damage of an impact target. In the paper, results of aggregates morphology of silicon nanoparticles prepared using disintegrator WJM have been presented via separated chapter of Atomic Force Microscopy AFM, Scanning Electronic Microscopy SEM, confocal optical microscopy, and laser diffraction.

Keywords: nanoparticle, water jet, cavitation, implosion, disintegration, milling, grinding, aggregate

Nanoparticles treat cancer just inside the tumor

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Application of ellipsometer Gaertner L119 to specify the optical parameters of liquids by SPR method (M. Lesňák, J. Trojčková, A. Talík) 185

The paper is focused on refractive index measurement of liquids by surface plasmon resonance (SPR). There are presented two variants of experimental setup. Functionality of experimental arrangement was analyzed by two steps, the first approach was realized by variously concentrated NaCl water solutions and the second one has been done by the change of water temperature.

Thin-film thickness determination from a spectral reflectance measurement by using an alternative envelope method

(M. Luňáčková, J. Luňáček, Z. Potůček, P. Hlubina) 188

This paper deals with an alternative method to determine the thickness of a thin film on a substrate. A linear relation between the thin-film thickness and the wavelength of the reflectance spectrum tangent to the envelope function for specific interference order is revealed in a wide wavelength range. This relation enables the calculation of the thickness provided that the wavelength-dependent optical parameters of the thin film and the substrate are known. The methods allow to calculate the thickness from the reflectance spectrum in a narrow range close to one extreme only as demonstrated both theoretically and experimentally for SiO_2 thin-films on Si substrates. The results are discussed for two wavelength ranges and compared with those obtained by the algebraic fitting method.

Keywords: spectral reflectance, thin-film, envelope method, absorption