Book of Abstracts

INTERPHOTONICS 2022

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INVITED SPEAKERS

Id-598

DESIGNING HYBRID MATERIALS with PROPERTIES SUITABLE for OPTICAL FIBER TECHNOLOGY

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Abstract: The aim of our work was to synthesize novel hybrid materials, where PMMA was used as a host for lanthanide complexes. The analytical methods (TG/DTG/DSC/MS) we chose to investigate physicochemical properties gave us a possibility to check whenever obtained materials are suitable for optical fiber technology. From an economic point of view, this is extremely important because instead of producing a preform, then drawing the fiber and then testing it, we can determine the suitability of the materials already before the preform production stage. In our studies, we have also check the luminescent features of both lanthanide complexes and the hybrid materials. Our results prove that obtained materials exhibits strong luminescence in the red and green spectral range before and after they had been introduce into the host. Additionally, which is very important from the technological point of view, the luminescent dopants do not significantly lower the thermal stability of the obtained hybrid materials.

Keywords: Hybrid materials; Luminescence; Polymer optical fibers; Thermal and spectroscopic analysis; Lanthanide complexes.

INVITED SPEAKERS

Id-599

ELECTRIC FIELD ENHANCEMENTS in ULTRATHIN PLASMONIC GAPS

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Abstract. The field of plasmonics exploits the unique optical properties of nanometallic structures to control and manipulate light at the nanoscale. Unlike glass, metals such as gold and silver have a negative dielectric function, which allows them to support collective electron excitations known as ‘surface plasmons’. These resonances produce extremely high local electric field intensities in localized regions. The theoretical description of the local electric field intensities should be performed at the quantum mechanical level. In this invited talk, I will address effects such as quantum tunneling of electrons in nanosized gaps from a quantum mechanical perspective.

Keywords: Plasmonics; Density functional theory; Metals; TD-DFT; Electric field.

INVITED SPEAKERS

Id-601

RECCURENT APHTOUS STOMATITIS TREATED with LOW LEVEL LASER THERAPY

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Abstract: Recurent aphtous stomatitis is a common and painful ulcerative lesion of the oral cavity. The underlying etiology remains unclear. Many therapeutic interventions have been tested, including Low Level Laser therapy (LLLT) which is considered lately as one of the effective treatments relieving patient's pain, but also it enables the accelaration of the healing proccess, and may cure the aphthous lesion. In our case, we presente, through a 35 years old female patient, an aphtous lesion in two locations (lingual and inferior labial), who was successufuly treated with low level laser therapy (940 nm diode laser) followed up over a period of 5 days with pain relief and complete healing of the lesion with no sign of recurrence.

Keywords: Recurrent; Aphthous Stomatitis; Low level laser therapy; Oral Mucosa.

INVITED SPEAKERS

Id-608

GRAPHENE QUANTUM DOTS - From CHEMISTRY to APPLICATION in PHOTODYNAMIC THERAPY

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Abstract: Graphene quantum dots (GQDs) attract huge scientific attention ever since they were discovered. They are the only 0-dimensional, water-dispersible graphene-based nanomaterial. They show (i) excellent biocompatibility; (ii) stable and tunable photoluminescence in the visible part of the spectrum resistive to photobleaching; (iii) large surface area; (iv) good solubility in water and polar organic solvents. Their astonishing properties stem from the structure: graphene in the core and a vast number of different oxygen-containing functional groups such as carboxyl, carbonyl, epoxy, hydroxyl, and lactone. Their lateral size is below 100 nm, and the height is from 0.5 to a few nm. Thanks to different oxygen groups, they have very reach chemistry; they can be easily processed, modified, and functionalized. GQDs can be modified after their synthesis using different chemical reactions, which lead to changes in oxygen content, the addition of heteroatoms, binding of target molecules. Heteroatoms can be built-in GQDs structure during the process of synthesis and usually, N, S, P are selected. They can be produced in many different ways and starting materials and all of them are dived into two main groups: bottom-up and top-down methods. Due to a large number of diverse functional groups and high surface area, GQDs create complexes with ions, cations, biomolecules, organic molecules, etc. Thanks to this feature, GQDs are studying for the application in sensing of heavy metal ions, selected anions, proteins, metabolites, hormones, enzymes, pesticides, organic colors, etc. Another exciting feature of GQDs is their ability to produce reactive oxygen species under visible light. In the present talk, I will discuss the application of GQDs in photodynamic therapy. First, I will provide a brief introduction to GQDs synthesis with a focus on top-down electrochemical synthesis using graphite as a starting material. The structure and possibilities for their modification will be explored. Our group observed the production of singlet oxygen when GQDs were exposed to blue light and this work was one of the first studies concerning applications of GQDs in photodynamic therapy. The application of gamma irradiation in GQDs modification will be explored as well as the production of single oxygen upon illumination. I will present how gamma irradiation in different irradiation media induces an increase of ROS production upon GQDs illumination. Also, the effect of the introduction of heteroatoms in the GQD structure will be analyzed too. Photoactive toxicity of GQDs toward cancer cells such as U251 human glioma as well as to bacterial cells (*Staphylococcus aureus* and *Escherichia coli*) will be discussed. While solely treatment of bacteria with GQDs or blue light did not induce cell death, the combination of

these treatments was efficient enough to induce oxidative stress and bacterial death. The mechanism of phototoxicity was found to be intracellular light-induced ROS production, from electron-hole pairs, and by energy-transfer and electron-transfer pathways, while some researchers claimed that cell rupturing is behind antibacterial effects. The strategy for measuring ROS production in the GQDs solution will be explained. Electron paramagnetic resonance with spin labeling agents will be discussed as a tool for dynamic ROS production measurement. In the end, the perspective and direction of the future research will be presented.The research was supported by Science Fond of the Republic of Serbia, 7741955 GRANT No, "Are photoactive nanoparticles salvation for global infectonal treath?" - PHOTOGUN4MICROBES and by the Ministry of Education, Science and Technological Development of the Republic of Serbia [grant number 451-03-9/2022-14/200017].

Keywords: Graphene quantum dots; Photodynamic therapy; ROS production; Photoluminescence; Photosensitizer.

INVITED SPEAKERS

Id-611

INFLUENCE of GROWTH ENVIRONMENT on STRUCTURAL and OPTICAL CHARACTERISTICS of BARLEY

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Abstract: Photosynthesis in plants occurs in a highly specialized membrane system of thylakoids inside chloroplasts. Thylakoids contain molecular complexes performing light-controlled photosynthesis reactions and providing a medium for energy transfer. Recent discoveries in electron microscopy have helped us to understand the three-dimensional architecture of this unique biomembrane system. Two barley samples were taken for the study – one grown in the field and the other in a special chamber under intensive light, both of Yemelya variety selected in Krasnoyarsk. This variety is highly resistant to lodging and drought. Measurements of chlorophyll fluorescence and gas exchange in flag leaves were performed in vivo by LI-6800 photosynthesis study system (LI-COR, USA) in a closed leaf chamber with a fluorimeter in it. Chloroplasts structure was obtained during electron microscopy process. The results showed that the maximum quantum yield of photosystem II in both samples was in the range of values typical for normal physiological state of plants. At the same time, electron transport speed comparison shows that electrons are transferred 1.7 times faster in the vegetation chamber compared to field environment. Such difference is confirmed by the results of microscopy performed with flag leaves tissue samples of barley grown under intensive light in a chamber and in the field. A grana structure significantly denser and better organized was observed in chloroplasts of barley grown in chamber. This study shows a clear connection between the environment, the ordering of thylakoid structures and fluorescent indicators of photosynthesis.

Keywords: Chloroplast; TEM; Fluorescence; Photosynthesis; Electron transfer.

INVITED SPEAKERS

Id-612

HIGH OPTICAL CONFINEMENT WAVEGUIDES for HIGH-SPEED WIDE-BANDWIDTH DATA TRANSMISSION and HEALTHCARE DATA TRANSMISSION FOR FUTURE NETWORKS

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Abstract: Silica-based planar lightwave circuits (PLCs) are key devices for optical communication networks based on optical transmission systems, which are for not only backbone use but also metropolitan and access networks. PLC devices have advantage in propagation loss and fiber coupling loss because they are made by silica as the same material as optical fibers. PLC devices, especially silica-based arrayed waveguide gratings (AWGs) for wavelength multi/demultiplexing, power splitters for branching the optical signal, optical switches for selecting from one circuit to another have been playing a key role in practical transmission systems. In these systems, it is expected to make PLC devices compact and highly-integrated on a single-chip in order to decrease cost in fabrication and increase channel number. To realize them, it is very important to reduce the size of the devices such as AWGs. For example, even when the refractive index difference Δ of the waveguide is 2.5 %, bent waveguides with a large curvature radius of one millimeter occupy a large area in a package. This prevents increasing the packaging density of the devices. One way to overcome this problem is to use extremely high- Δ (>2.5%) waveguides that can be bent compactly. This talk focuses on the development of high optical confinement waveguides which are used for PLC devices as extreemly high- Δ waveguides, and also healthcare data transmission for possible future networks is discussed.

Keywords: Silica-based Planar Light Wave Circuit (PLC); Arrayed waveguide grating (AWG); High refractive index difference (high- Δ); Healthcare data; Electroencephalography (EEG).

INVITED SPEAKERS

Id-622

WEED CONTROL with LASER BEAMS: An ECOFRIENDLY ALTERNATIVE to HERBICIDES and MECHANICAL WEED CONTROL

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Abstract: In the EU, we apply ca. 130 million tons of herbicides every year to control weeds to ensure high crop yields with good quality. This massive use of herbicides has led to the increasing occurrence of herbicide-resistant weeds and unwanted contamination of the environment. Substitution of herbicides with mechanical solutions may result in soil erosion and deterioration of soil properties. Mechanical weed control also harms beneficial insects and soil organisms and provides poor results for in-row weeding. Therefore, there is a need to develop more sustainable weed control means. We suggest using small autonomous vehicles equipped with lasers as a sustainable and eco-friendly alternative to replace or supplement herbicide application and mechanical weed control. Laser beams are based on electricity, which can be produced from non-fossil fuels. Deep learning methods can be used to locate and identify weed and crop plants for targeting and delivery of laser energy with robotic actuators. Given the targeted nature of laser beams, the area exposed for weed control can be reduced substantially compared to commonly used weed control methods. Consequently, the risk of affecting non-target organisms is minimized, and the soil will be kept untouched in the field, avoiding triggering weed seeds to germinate. Small autonomous vehicles may have limited weeding capacity, and precautions need to be taken as reflections from the laser beam can be harmful to humans and animals. This presentation discusses the advantages and disadvantages of replacing or supplementing commonly used weed control methods with laser weeding. The ability to use laser technology for controlling weeds is relatively new and not yet widely practiced or commercially available. Therefore, we do not discuss and compare the costs of the various methods at this early stage of the development of the technology.

Keywords: Alternative weed control; Integrated weed management; Non-chemical weed control; Site-specific weed management; Thermal weed control; Weed killers.

REGULAR SESSIONS

Id-582

AIR-COUPLED SCANNING LASER DOPPLER VIBROMETRY IMAGING of ACOUSTIC WAVES GENERATED by a GAS DISCHARGE EMITTER

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Abstract: Scanning Laser Doppler Vibrometry (SLDV), being a high-sensitive technique for analyzing mechanical vibrations, allows the evaluation of spatial and amplitude characteristics of acoustic waves generated in the air by air-coupled ultrasonic emitters. The refraction of laser beam in the areas of oscillating air pressure enables measuring amplitude-frequency parameters of propagating waves in a wide range of frequencies, including visualization of vibration patterns, in a single experiment. The corresponding experimental results can be useful in stydying parameters of ultrasonic transducers, such as frequency range, wave spatial distribution and damping in the air medium. In this study, the experimental results, which are related to the analysis of acoustic waves in the air, are presented. The waves were generated by means of an air-coupled gas discharge emitter with the main application area being related to nondestructive testing of composites. It was shown that a pulsed regime of wave excitation ensures acoustic vibrations in a solid material in the frequency range from 10 Hz to 100 kHz and helps to avoid the appearance of spurious standing waves.

Keywords: Scanning laser vibrometry; Noncontact imaging; Airborne activation; Air-coupled ultrasonic transducers; Gas discharge emitter.

REGULAR SESSIONS

Id-602

ORAL PAPILLOMA TREATED with LOW LEVEL LASER THERAPY

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Abstract: Oral papilloma is a benign proliferation of the stratified epithelium, which results in a papillary or verrucous exophytic mass which can be induced by human papilloma virus (HPV). These oral mucosa lesions are most often asymptomatic and have small progression. Laser assisted surgery is common nowadays with several advantages including successful hemostasis, devoid of sutures, wound sterilization and minimal post-operative pain and edema. The aim of this report is to present the oral papilloma in a 40 years old female patient and its treatment with soft tissue laser. The lesion was excised with diode laser and the healing was uneventful in follow-up visit after 1 month. Oral papillomas can be found in young adult patient's oral cavity and laser dentistry can be used by dental clinicians to treat these kinds of oral lesions and should be considered as an alternative to conventional surgery.

Keywords: Oral Papilloma; Low level Laser; Therapy; Oral Mucosa.

REGULAR SESSIONS

Id-607

SPASERS in the near INFRARED

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Abstract: Plasmonic nanolasers (spasers) are of tremendous interest because of their ability to generate a high-intensity coherent radiation. Spasers are composed of a metal nanoparticle acting as the resonator surrounded by a thin layer of active medium (e.g. fluorescing molecules such as fluorescein, rhodamine, etc.) separated from the nanoparticle by a polymer or porous materials (silica, alumina, etc.). Here the results of spasers formation emitting in the near infrared range are presented. We developed an approach for creation gold nanorods with broadly tunable longitudinal surface plasmon resonance. To avoid direct contact of the active medium molecules with the nanoparticles, the latter were encapsulated with mesoporous silica. We developed a method for the control of the SiO_2 shell thickness as well as its porosity and showed that the amount of the dye loaded can be changed over a wide range. In addition, we developed a simple method to obtain yolk-shell nanoparticles by formation of a polystyrene sulphonate shell surrounding gold nanorods, which can be filled with organic dyes. All the obtained samples were investigated by a complex of physicochemical methods (scanning and transmission electron microscopy; Raman spectroscopy and energy-dispersive analysis; spectroscopy of dynamic light scattering, etc.). Also, the behavior of the particles in lining cells were investigated *in vitro*. The authors thank the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No. 838845.

Keywords: Gold nanoparticles; Spaser; Infrared; Core-shell; Laser.

REGULAR SESSIONS

Id-610

NUMERICAL OPTIMIZATION of GAIN REGION in DUAL UPPER STATE QUANTUM CASCADE LASER

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Abstract: The advance simulation tool which utilizes the nonequilibrium Green Function (NEGF) method is used to analyze and optimize the gain region of the quantum structure used in the quantum cascade laser. The device under consideration is tailored to emit the radiation of 11.5 μm wavelength, and is supposed to find an application in trace sensing of BTEX (benzene, toluene, ethylbenzene, and xylenes) gases. This application require widely tunable, broad-gain devices. The design with two upper levels detuned by a small amount, is the one that could provide such gain profile. On the other hand gain broadening is on the expense of the gain peak so that poorer performance of such device is expected. Recently it was shown, however, that the performance of the QCL device can be increased not only by maximizing the gain peak but also by minimizing the gain recovery time – a parameter that characterizes the interaction of light and matter in the quantum device. One strategy to reach this condition is to optimize the width or height of the injection barrier responsible for laser pumping. The method used for this purpose must include both electron and photon fields and theirs interaction. The one applied in this contribution is the NEGF method in which the mentioned interaction was taken into account through electron-photon selfenergy. By means of extensive numerical simulations it is shown that improvement of the structure proposed is possible by thinning the injection barrier by 0.3 nm. Results of the calculations show that the output optical power from the device with thinner injection barrier is increased by ~ 30%. This project is financed by the Minister of Education and Science of the Republic of Poland within the “Regional Initiative of Excellence” program for years 2019–2022. Project number 027/RID/2018/19, amount granted 11 999 900 PLN.

Keywords: Quantum cascade laser; Electron-photon interaction; Dual upper state; NEGF.

POSTER SESSIONS

Id-578

SINGLET OXYGEN GENERATION in MICELLES with PICEA ABIES EXTRACTS

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Abstract. The study of singlet generation in APT micelles containing *Picea abies* extract was carried out in visible and near IR spectral range. It was obtained that the microemulsion solution with extract had an absorption peak at ~300 nm and luminescence peak at 680 ÷ 720 nm wavelength range. Taking into account the experimental data of time-resolved spectroscopy, the possibility of reactive oxygen forms generation in the microemulsion with the extract was proved. The quantum efficiency of singlet oxygen generation on absorption at a wavelength of 400 nm by the extract has been determined molecular oxygen at its different concentrations inside the reverse micelles of AOT with the extract. The energy deactivation rate constants in the contact complex after photoexcitation under triplet states quenching of the extract molecules have been determined. The research was supported by the Ministry of Science and Higher Education of the Russian Federation (Project Nr. FZWM-2020-0003).

Keywords: Singlet oxygen; *Picea abies* extract; AOT micelles; Luminescence; Time-resolved fluorescence spectroscopy.

POSTER SESSIONS

Id-604

The ANTIFUNGAL ACTIVITIY of COMPLEX METAL OXIDE $RbTe_{1.5}W_{0.5}O_6$ under VISIBLE LIGHT

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Abstract: It is known that nano- and microsized particles of heavy metal oxides have antimicrobial properties against fungi and bacteria. It has been studied that many of them have photocatalytic activity, which significantly enhances their antimicrobial properties. The antimicrobial effect is based on the ability of oxides to form reactive oxygen species (ROS) under the light. The search for compounds that absorb light in the visible range of the spectrum is topical. Such a compound can be the complex oxide $RbTe_{1.5}W_{0.5}O_6$. Complex metal oxide $RbTe_{1.5}W_{0.5}O_6$ were obtained by the solid-state synthesis method. Rubidium nitrate, tellurium and tungsten oxides with a molar ratio of Rb:Te:W = 1:1.5:0.5 were used as initial reagents. The $RbTe_{1.5}W_{0.5}O_6$ compound belongs to the β-pyrochlore structural type. It has been shown that the $RbTe_{1.5}W_{0.5}O_6$ compound has a wide band gap of 3.5 eV corresponding to the UV range by spectroscopy, but despite this fact, it is capable of absorbing light in the visible region of the spectrum by impurity defect level into band gap structure. When photons are absorbed, electron-hole pairs are formed. Electron-hole pairs are involved in reactions leading to the formation of reactive oxygen species, which inhibit the vital activity of microorganisms. It has been established that this compound inhibits the growth of bacteria and fungi (spores and vegetative mycelium) under the visible light. The flux density of LED spotlights affecting the studied bacterial cultures was 325.5 W/m^2 (30 W source) and 524 W/m2 (50 W source). It is noted that the antimicrobial effect of this compound depends on the size of the particles, the power of the light source and the exposure time. This work was supported by the financial support of the Ministry of Education and Science of the Russian Federation (the basic part of the State assignment, project 0729-2020-0053).

Keywords: β-pyrochlore structure type; Photocatalysis; Oxide materials; Reactive oxygen species; Antifungal activity.

POSTER SESSIONS

Id-627

SINGLE LASER IRRADIATED LANTHANIDE DOPED TELLURITE GLASSES for VOLUMETRIC 3D DISPLAY APPLICATIONS

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Abstract. Human vision perceives the world in three dimensions. However, commercially available displays are able to convey only two-dimensional images. Several approaches have been proposed to overcome the fundamental restriction of two-dimensional displays – e.g. virtual reality and stereoscopic displays. These technologies have serious constraints that limit their application to general public – narrow viewing angle or even only a single-user access and/or a need to wear uncomfortable gear. A concept of a laser-based volumetric display has been recently developed to tackle the aforementioned shortcomings, however none of the proposed screen materials has so far met the criteria needed for a successful volumetric display. Tellurite glasses can be seen as promising materials for photonic applications in visible and infrared region because of their unique set of physico-chemical properties including high optical transmittance in a large transmission window, high chemical durability and thermal stability, ease of large-scale production, high lanthanide ions solubility and low phonon energy enabling enhancement of up-conversion processes. As we previously reported, red, green and blue emissions as main color components can be obtained via frequency modulation of the 980 nm laser excitation source in a designed tellurite glass composition. This phenomenon opens the way for use of these glasses in volumetric display applications. In this work, Ce^{3+} and/or Nd^{3+} ions are incorporated together with $Ho^{3+}/Tm^{3+}/Yb^{3+}$ ions into a thermally and chemically stable Li_2O-WO_3-TeO_2 glass matrix to achieve full-color tunable emission by excitation modulated PL measurements via changing power density, pulse width and frequency parameters. Color space coordinates and purities of the obtained emissions are calculated to determine the color gamut upon excitation modulated single beam irradiation and to evaluate the suitability of such materials for 3D volumetric displays. The authors acknowledge the Scientific & Technological Research Council of Turkey (TÜBITAK) and the Czech Academy of Sciences for their financial support under the projects numbered 120N754 and TÜBITAK-21-11, respectively. Petr Kostka acknowledges the Czech Science Foundation for the support of the project No. 19-07456S.

Keywords: Tellurite glass; Volumetric display; Photoluminescence; Up-conversion emission; Rare earths.

POSTER SESSIONS

Id-628

INFLUENCE of the SIZE of ZnO NANOPARTICLES on THEIR OPTICAL PROPERTIES

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Abstract: Zinc oxide nanoparticles (ZnO NPs) have a promising and remarkable potential for many areas of technology due to their unique properties. In this study, ZnO NPs were prepared by the sol-gel method to demonstrate the influence of the particle size of ZnO NPs on their optical properties. 0.2M ZnO sol solution was prepared to produce NPs. The pH was adjusted to 12 with a 1.0M NaOH solution. Two different ZnO NPs were obtained by washing 3 times and 6 times and calcination temperature of 800°C and 450°C, respectively. The microstructural characterization of the ZnO NPs was determined by by X-ray diffraction (XRD), scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDS). The optical properties were determined using The UV-3600i Plus model UV-Vis-NIR spectrophotometer. In XRD analysis, both samples have a hexagonal wurtzite ZnO structure (JCPDS No. 00-036-1451) and the average NP sizes were calculated at 52.65 nm at 800°C, with 3 washes and 25.11 nm at 450°C with 6 washes from XRD data. The results showed that the crystallite size of the particles were decrease when the calcination temperature was lowered and the washing time was increased. It was observed that the optical properties of the ZnO NPs were significantly affected by the size of the NPs. It can be concluded that ZnO NPs calcined at low temperature could be a strong candidate for various industries.

Keywords: ZnO NPs; Sol-gel; UV-Vis-NIR.

POSTER SESSIONS

Id-629

OPTICAL PROPERTIES of GRAPHENE OXIDE USING MODIFIED HUMMERS METHOD

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Abstract: Graphene and graphene oxide (GO) are known to have superior properties for various applications. Hummers method has been the most widely used to prepare GO. This study presents a study of a modified Hummers method with $NaNO_3$-freeby controlling the amount of concentrated Hydrochloric acid. The structural and optical properties of the prepared GO were characterized by XRD, DTA/TGA, particle size distribution analysis and UV-vis spectroscopy. This study, we highlight advances in optical properties of chemically derived GO.

Keywords: Graphene; Graphene oxide; Hummers method; UV–vis spectroscopy.

POSTER SESSIONS

Id-630

ENERGY TRANSFER between HOST-GLASS and DOPED-IN RARE-EARTH IONS: BROAD-BAND EXCITATION of RARE EARTHS in GLASSES

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Abstract: By comparing tellurite and silica glasses doped with rare earths ions, we show how the nature of the host material affects the interaction between the doped-in rare earth ions and the surrounding glass matrix. Rare-earth ions can be excited directly by absorption of radiation resonating with their internal 4*f*-4*f* transitions or indirectly via the host material. The direct excitation of rare-earth ions takes place with little or no interaction with the surrounding material. In the second – indirect – method of excitation the host material itself is excited by absorption of radiation with wavelength overlapping with its absorption edge or in resonance with some deep levels in its band gap, then the absorbed energy is transferred to the doped-in rare earth ions. In both these cases, the radiation generated by down-transitions of doped-in rare earth ions can be observed at room temperature, but the radiation from exited host glass is often observed only at low temperatures. Thus, the low-temperature photoluminescence spectroscopy allows for simultaneous observation of the host-glass luminescence, which is characterized by a broad luminescence band centered at approximately mid-gap energy, with the superposed narrow bands associated with inner shell 4*f*-4*f* transitions in rare-earth ions. In some cases, these sharp emission bands are preceded by narrow dips in the broad luminescence band of the host glass. The dips correspond to Stokes-shifted up-transitions related to the observed emission peaks. We argue that these narrow absorption dips represent a direct evidence of energy transfer between the electronic structure of the host and 4*f* states of doped-in rare earth ions. The authors acknowledge the Czech Science Foundation for the support of the project No. 19-07456S.

Keywords: Rare-earths; Tellurite glass; Photoluminescence; Broad-band excitation; Energy transfer.

ALL SUBMISSIONS & TOPICS

Topics	Submissions
Biophotonics	Id 578 - Singlet Oxygen Generation in Micelles with Pıcea Abies Extracts
	Id 604 - The Antifungal Activity of Complex Metal Oxide $RbTe_{1.5}W_{0.5}O_6$ under Visible Light
	Id 611 - Influence of Growth Environment on Structural and Optical Characteristics of Barley
High Power Laser Technology, Ultrafast Optics and Applications	Id 610 - Numerical Optimization of Gain Region in Dual upper State Quantum Cascade Laser
	Id 622 - Weed Control with Laser Beams: An Eco-friendly Alternative to Herbicides and Mechanical Weed Control
Nano-Photonics and Plasmonics	Id 599 - Electric Field Enhancements in Ultrathin Plasmonic Gaps
	Id 607 - Spasers in the Near Infrared
Optical Fibers	598 - Designing Hybrid Materials with Properties Suitable for Optical Fiber Technology
Optical Materials and Applications	Id 608 - Graphene Quantum Dots - From Chemistry to Application in Photodynamic Therapy
	Id 627 - Single Laser Irradiated Lanthanide Doped Tellurite Glasses for Volumetric 3D Display Applications
	Id 629 - Optical Properties of Graphene Oxide Using Modified Hummers Method
	Id 630 - Energy Transfer between Host-Glass and Doped-In Rare-Earth Ions: Broad-Band Excitation of Rare Earths in Glasses
Photonic Networks and Devices	Id 612 - High Optical Confinement Waveguides for High-Speed Wide-Bandwidth Data Transmission and Healthcare Data Transmission for Future Networks

Optical Characterization	Id 582 - Air-Coupled Scanning Laser Doppler Vibrometry Imaging of Acoustic Waves Generated by a Gas Discharge Emitter
	Id 628 - Influence of The Size of ZnO Nanoparticles on Their Optical Properties
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	Id 602 - Oral Papilloma Treated with Low Level Laser Therapy