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Abstracts

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This book contains the materials on the fundamental and applied problems of pulsed lasers. It may be interesting for researches and engineers working in the sphere of quantum electronics, spectroscopy, plasma physics, medicine, remote sensing and laser technologies.

Designed by *Kirill O. Osiev, osiev@inbox.ru*

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FORMATION OF A HIGH-FREQUENCY DISCHARGE IN THE METAL VAPOR LASERS

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The evolution of an electric discharge in the active self-terminating metal atom laser medium is examined. Electrodes in the gas discharge tube are placed in cold buffer zones at a distance of several centimeters from the thermally insulated gas discharge channel. It is shown that an abnormal glow discharge is initiated in the cold buffer zones, as capacitive components of the discharge circuit charge from a storage capacitor. In this case, the current-voltage characteristic of the abnormal glow discharge in the cold buffer zones exhibiting a steep current growth and sharp voltage drop is illustrated in the right-hand branch of the Pashcen curve. These processes cause the discharge to pinch. As the capacitive components charge from the storage capacitor for the electrodes in the gas discharge tube placed in the cold buffer zones at a distance of $\leq 1-3$ mm from the thermally insulated gas discharge channel, an obstructed discharge is formed in the cold zones. On ignition of the discharge shown in the right-hand branch of the Pashcen curve the current accompanied by gas heating eliminates the contraction of the discharge in the cold buffer zones and initiates a high-frequency discharge in the active medium since the instant the breakdown (pinch) occurs. In this case, the current-voltage characteristic is demonstrated in the left-hand branch of the Pashcen curve.

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SYNTHESIS AND CHARACTERIZATION OF CHITOSAN-BASED POLYELECTROLYTE COMPLEXES, DOPED BY QUANTUM DOTS

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Quantum dots could be used in bio-imaging and biosensor applications due to their unique optical properties. However, these system are toxic, therefore, this method can't be used directly. Encapsulation of quantum dots into polymeric structures (both natural and artificial) avoids such problems, but the question of stability of the optical properties of a fluorophores is still opened.

In this work, the approach of synthesis of stable solutions of the biopolymeric polyelectrolyte complexes based on chitosan and chondroitin sulphate with encapsulated quantum dots was presented. The particle size was about 400 nm. The influence of pH (in the range from 3 to 5.6) and ionic strength (in the range from 0 to 1.33 M) of solvent on absorption and fluorescence properties of encapsulated quantum dots CdTe and CdSe/ZnS (with sizes of 2–3 nm) was investigated. It was shown that the stability of the emission intensity of the encapsulated quantum dots strongly depends on their concentration.

PHOTONICS OF AZO-SUBSTITUTED DIPYRRROMETHENE COMPLEXES WITH P- AND D-ELEMENTS

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Study of complexes of dipyrromethene with different structure is one of the most successfully developing areas of modern chemistry. The demand for using a variety of optical devices in modern technology makes it necessary to explore the photonics of new organic luminophores (coordination