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ABSTRACTS

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The luminescence quantum yield of the formed uranyl complexes was calculated by the reference dye method using a uranyl hexahydrate nitrate solution in water as a standard. The obtained data were used to estimate the degree of luminescence quenching of uranyl ions in the presence of organic ligands. As a result of the addition of the ligands, the luminescence of the uranyl ion is significantly quenched in comparison with the solution of pure salt. A maximal drop in the luminescence quantum yield was observed from 64.4 to 2.8% for the ligand with R = 2OMe.

In the presence of ligands, the luminescence lifetime of the uranyl ion is shortened by a factor of 2 as compared to that for the uranyl hexahydrate (from 191 μs to 91, 110, 78, and 73 μs for ligands with substituents H, 2F, 2Me, and 2OMe, correspondingly). The luminescence of the uranyl ion is sensitive to the type of substituent; therefore uranyl complexes can be used as luminescent probes.

The results have been obtained under support of the RSF Grant No. 21-73-20138.

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DETAILED STUDY ON OPTICAL PROPERTIES OF $Li_2B_4O_7$ FOR DOWN CONVERSION TO MILLIMETER WAVES

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For the first time, we measured the laser damage threshold of LB4 nonlinear crystal (≥ 10 TW/cm^2) for an fs- (60 fs, 950 nm) pulses. Refractive index components for a THz range 0.15-1.6 THz were measured and carefully reapproximated in terms of Sellmeier dispersion equations. Using the equations and the measured optical breakdown threshold, the efficiency of THz radiation generation is estimated for all possible types of three wave interactions. For e–e → e type of interaction $d_{eff} = (2d_{15} + d_{31})\cos^2\theta\sin\theta + d_{33}\sin^3\theta$, o–o → e type $d_{eff} = d_{31}\sin\theta$, and for o–e → o type $d_{eff} = d_{15}\sin\theta$. The angle at which the phase matching conditions are achieved for THz radiation generation at frequencies < 1.5 THz is $\leq 10°$. Small values of the phase matching angles and, accordingly, small values of effective nonlinear coefficients explain the lack of experimental studies on the THz generation.

The extremely high optical breakdown threshold and high atmospheric transmission in the long-wavelength part of the THz range overcompensate low efficient nonlinear coefficients of LB4. Which makes it prospective for long trace high sensitivity probing of the atmosphere composition and parameters.

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THEORETICAL DESIGN OF LSMO/6T SPINTERFACE

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Hybridization at the interface between molecular objects and ferromagnetic metals leads to dramatic changes in the properties of both interface fragments. It is noteworthy that an increase of the spin polarization near the Fermi level, modulation of magnetic anisotropy and spin flip transitions, as well as the appearance of spin polarized states in molecular layers can be observed in ferromagnetic layers material. These new hybrid interfaces with unexpected spin functionality, named after Sanvito's pioneer paper "spinterfaces," play a key role in design of molecular element for the development of novel spin devices. Among the variety of spin interfaces, composites containing semimetallic ferromagnetic oxides such as $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) are of particular interest.