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PULSED LASERS AND LASER APPLICATIONS

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ABSTRACTS

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intense absorption in the visible region is associated with the presence of various nature defect states of in the structure which also correlate with photoluminescence data. The catalysts were examined in the process of photocatalytic decomposition of the dye Rhodamine B under LED source (375 nm) and a visible region broad band lamp source (Philips Master Color CDM-TD 70W/942 lamp with a YG-11 light filter). It was found that the materials exhibit good activity under both LED and broad-band source irradiation. The influence of the nature of defects on the efficiency and mechanisms of dye destruction is considered.

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Y-21

FEATURES OF BISMUTH AND SILICON OXIDES SYNTHESIS BY PULSED LASER ABLATION IN WATER

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Semiconductor nanomaterials are widely used in photocatalysis due to a number of advantages such as efficient electron separation and flexible choice of semiconductor with desired band gap for efficient light absorption. Bismuth silicates (BSO) are promising new photocatalytic materials for organic decomposition and hydrogen production [1]. Currently mainly chemical methods of synthesis are used to obtain BSO materials.

In this work for the first time complex oxides BSO were prepared via pulsed laser ablation (PLA) in a liquid. PLA was performed by exposing Si and Bi targets to Nd:YAG laser radiation (1064 nm, 7 ns). Separately synthesized nanocolloids were mixed and subjected to additional laser irradiation and then dried. Using different Si/Bi ratios, as well as temperature treatment of the resulting powders, BSO of various compositions were synthesized, including monophases of the compounds Bi_2SiO_5 , $\text{Bi}_4\text{Si}_3\text{O}_{12}$ and $\text{Bi}_{12}\text{SiO}_{20}$. The photocatalytic activity of the samples was estimated by the decomposition of Rhodamine B under LED source irradiation with $\lambda_{\text{rad}} = 375$ nm.

The effect extra irradiation of colloids mixture on the formation of the structure of complex oxides BSO at different Si/Bi ratios has been studied. The correlations between the optical properties, composition and structure of catalysts and their photocatalytic properties has been established. It was shown that the best photocatalytic activity exhibits $\text{Bi}_{12}\text{SiO}_{20}$ powders.

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1. Belik Yu., Kharlamova T., Vodyankin A. et al. // Cer. Int. 2020. V. 46, No. 8. 10797–10806.

Y-22

HIGH INTENSITY LIGHT CHANNELS FORMED DURING THE PROPAGATION OF HIGH POWER FEMTOSECOND LASER RADIATION IN AIR

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The results of experimental and theoretical studies of the evolution of the small scale transverse structure of high power femtosecond laser radiation under conditions of multiple filamentation in air are considered.

Experimental studies were carried out for wide-aperture (centimeter) collimated beams of femtosecond pulses of a titanium sapphire laser. The pulse energy was up to 40 mJ, which provided a sub-terawatt power level. As a result, the features of propagation of spatially isolated high intensity