



The mechanism of enhancement of photoinduced absorption in As₂S₃ glass at sub-bandgap illumination

A. M. Andriesh, N. A. Enachi, I. P. Culeac, T. N. Copaci,
V. A. Binchevici

[https://doi.org/10.1016/0022-3093\(95\)00197-2](https://doi.org/10.1016/0022-3093(95)00197-2)

Abstract

The dependence of additional optical losses due to illumination of optical As₂S₃ glass fibers has been investigated. The qualitative explanation of the observed dependence is given based on the model of activation of carriers and their redistribution on localized states in As₂S₃ glass stimulated by sub-bandgap light $h\nu_{sb} < E_g$ at 77 K, which leads to the value of photoinduced absorption in the material studied. It was found that subsequent illumination of the samples with sub-bandgap light can not only bleach the previously induced absorption but it can also produce an enhancement of photoinduced absorption. The mechanism of non-monotonic property of the kinetics and transient enhancement of photoinduced absorption is discussed. A system of rate equations which describes the process of excess carrier generation, their trapping and redistribution on localized states is proposed. The results of computer simulation of mathematical solutions obtained from photoinduced absorption rate equations are in good agreement with experimental results.