

Proceedings of SPIE, 4078: 587-594
SPIE--The International Society for Optical Engineering.
July 2000

Broadband Cr:YSO Solid State Saturable Absorber for Ruby, Alexandrite,
and Cr:LiCAF Lasers: Numerical Study on Passive Q-switching
Performance

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Abstract

The Cr:YSO solid-state crystal has broad absorption bands in visible and near infrared spectral region. Although Cr:YSO was originally developed for laser applications, our experiments and numerical simulations show that it can act as an effective saturable absorber Q switch for the ruby laser at 694.3 nm, for the tunable alexandrite laser from 700 to 818 nm, and for the tunable Cr:LiCAF laser from 725 to 840 nm. Since the Cr:YSO is a robust solid-state crystal, the durable Cr:YSO Q-switched solid-state laser systems may find various practical applications. In this paper, theory of passive Q-switching with solid-state saturable absorber is briefly reviewed. Details of the numerical situation for the passively Q-switched solid-state laser systems are presented.