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Problems in searching for new solid-state UV- and VUV-active media: The role of photodynamic processes

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Abstract

The impact of photodynamic processes induced by pump radiation in crystals doped with rare-earth (RE) ions on the possibility of generating stimulated radiation in the UV and VUV spectral ranges is analyzed. It is shown that, in addition to objective factors, one of the main causes preventing the lasing effect from being obtained using the interconfigurational $4f\ n - 15d-4fn$ transitions of RE ions is insufficient consideration of the photodynamic processes involved in experiments. It is proposed to correct laser test techniques and "pump-probe" experiments aimed at investigating active media appropriate for lasing in the UV and VUV ranges. Extended criteria oriented to search for new solid-state UV and VUV active media are formulated. © 2005 Pleiades Publishing, Inc.

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