



Third-order nonlinearities and other properties of molybdenum lead-pyrophosphate glass

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Résumé en anglais	<p>Glasses in the binary system $(100-x)\text{Pb}_2\text{P}_2\text{O}_7-x\text{MoO}_3$, with $x = 10 - 80$ mol %, were synthesized by conventional melt-quenching technique. Thermal analysis, linear optical absorption, refractive index measurements, Raman scattering and nonlinear (NL) optical experiments were performed to characterize the samples. The dependence of MoO_3 content on thermal, structural and optical properties was investigated. Molybdenum oxide increases both the glass transitions temperature and thermal stability against devitrification up to 50 mol % due to formations of P-O-Mo linkages and the glass network connectivity increases. The nonlinear optical properties were studied at 1064 nm and 532 nm with pulses of ≈ 17 ps. The NL refractive index measured was $+10^{-19}$ m²/W at both wavelengths for samples with different relative concentrations of the constituent compounds. At 1064 nm we determined that the two-photon absorption coefficient, β, is smaller than the minimum that we can measure (< 0.01 cm/GW) while at 532 nm we measured 0.25 cm/GW. The nonlinear response of the samples is attributed to contributions from the lone electron pairs of Pb^{2+}, MoO_3 clusters, and to Mo^{5+} and Mo^{4+} ions.</p>
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