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White light generation controlled by changing the concentration of silver nanoparticles hosted by Ho^{3+}/ Tm^{3+} /Yb^{3+} doped GeO_2 – PbO glasses

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Abstract

Frequency upconversion (UC) experiments were performed with GeO_2-PbO glasses, containing silver nanoparticles (NPs), doped with holmium (Ho^{3+}), thulium (Tm^{3+}) and ytterbium (Yb^{3+}) ions. The samples were excited using a continuous-wave diode laser operating at 980 nm. The UC intensities and the colors of the samples were controlled by changing the concentrations of the rare-earth ions (REI) and the silver NPs nucleated inside the samples. The colors observed spanned the visible range from the red-yellow to the blue.