Supplementary Information for

Mutiphoton Absorption in Europium (III) doped YVO$_4$ Nanoparticles

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Figure S1. Low-resolution TEM image of the synthesized YVO$_4$:5%Eu$^{3+}$ NPs with rod-like morphology and sizes between 20 nm and 30 nm.
Figure S2. Dispersion of the real and imaginary parts of the complex hyperpolarizability $\gamma$ of YVO$_4$ NPs (a, b) and YVO$_4$:5%Eu$^{3+}$ NPs (c, d) determined from Z-scan measurements in chloroform solutions containing 0.5% w/w of the NPs. The lines at $\text{Im}(\gamma)$ plots were added just as the guide for the eye.

The presentation of the data in the form of the complex cubic hyperpolarizability assumes that the nonlinear response of the investigated species is purely cubic. Analysis of Z-scans traces measured at longer wavelengths (1200 nm – 1400 nm) indicated that this assumption is not fulfilled there, and most probably we observe higher-order NLO response in that wavelength range.