Research (What is it about?)	**Organic heterometallic complex as an upconversion material**
UNN authors	*Bochkarev M., Grishin I., Andreev B., Yablonskiy A.*
We find (The result)	The first ***bimetallic organic-lanthanide*** complex manifesting upconversion properties has been synthesized
Abstract	Upconversion effect (***luminescence with a higher frequency than that to absorbed light***) finds now a lot of applications from medicine to solar panels. The term upconversion covers nonlinear optics phenomena, including second and third harmonic generations or two photon absorption, as well as multiple first-order absorption. Since the latter has a higher probability than the second and third-order processes, it causes the most efficient upconversion. In this case, a luminescent material should possess a ladder-like energy levels set consisting of long-lived excited states and be prone to energy transfer from the sensitizer towards the activator center. Such features are typical for many lanthanide-doped glasses, ceramics and nanoparticles containing Ho^{3+} , Er^{3+} or Tm^{3+} as emissive and Yb^{3+} as sensitizing ions. All known lanthanide upconversion materials are inorganic systems because in the organic complexes the high effective vibrations of organic groups prevents upconversion process. We synthesize the first bimetallic ***ErYb(L)$_6$*** complexes with ligands L= 3-(2-benzothiazol-2-yl)-2-naphtholate (NpSON) and pentafluorophenolate (C_6F_5O) in which excitation of Yb^{3+} by the laser irradiation with λ= ***910 and 980 nm*** induce the effective intramolecular energy transfer $Yb^{3+}\rightarrow Er^{3+}$. As a result, the short-wavelength emission at ***550 nm was found*** in the luminescence spectra besides the band at 1530 nm, which indicates upconversion phenomenon.

Representative articles 2017-2018, quartiles	1. *Balashova T.V., Pushkarev A.P., Yablonskiy A.N., Andreev B.A., Grishin I.D., Rumyantcev R.V., Fukin G.K., Bochkarev M.N.* Organic Er-Yb complexes as potential upconversion materials. Journal of Luminescence. **192**, 208-210 (2017).	Q2
	Q-index (Qi) for the result	**3**
	high orange	

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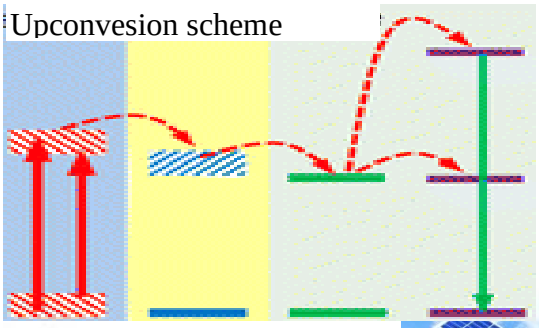
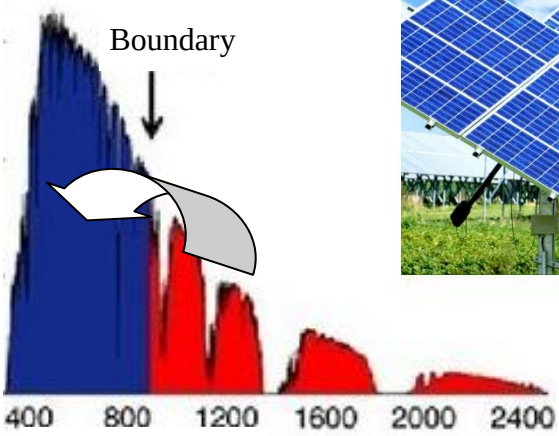
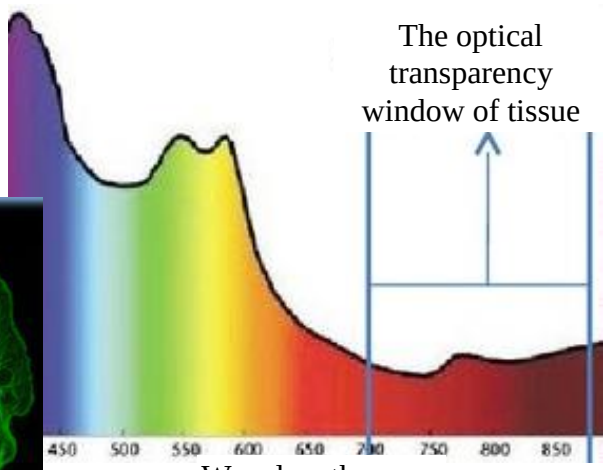
Upconvesion scheme

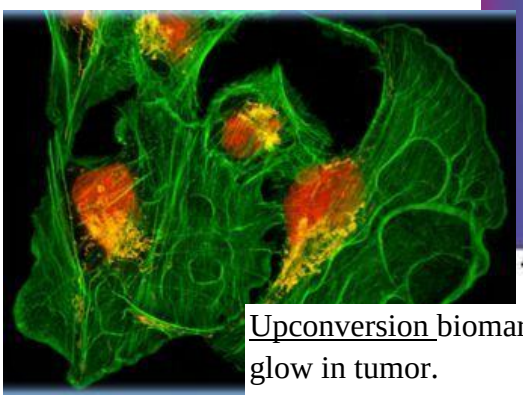




The Solar spectrum and the band of its using in solar panel without upconversion (blue). When upconversion realize the new band of spectrum is pulled (curly arrow).

Absorption spectrum of biological tissue and the band of biomarkers excitation in it.





Upconversion biomarkers glow in tumor.

Upconversion in complex $Er_{0.67}Yb_{1.33}[(CF_3)_2CHO]_9$

RO = $OCH(CF_3)_2^-$