## ELECTRONIC SUPLEMENTARY INFORMATION

# On the development of the new approach to the design of lanthanide-based materials for solution-processed OLEDs

Makarii I. Kozlov,[a] Andrey N. Aslandukov,[a] Andrey A. Vashchenko,[c] Alexey V. Medvedko,[a] Alexey E. Aleksandrov,[d] Raitis Grzibovskis,[e] Alexander S. Goloveshkin,[f] Leonid S. Lepnev,[c] Alexey R. Tameev,[d] Aivars Vembris,[e] and Valentina V. Utochnikova*[a,b]

[a.] *M.V. Lomonosov Moscow State University*
*1/3 Leninskye Gory, Moscow, 119991, Russia*
[b.] *EVOLED Ltd*
*1A-24 Puškina iela, Riga LV-1050, Latvia*
[c.] *P.N. Lebedev Physical Institute*
*Leninsky prosp. 53, Moscow, 119992, Russia*
[d.] *Institute of Solid State Physics*
*University of Latvia*
*8 Kengaraga iela, Riga, LV-1063, Latvia*
[e.] *A.N. Nesmeyanov Institute of Organoelement Compounds*
*Vavilova St. 28, Moscow, 119334, Russia*

**Table 1. Indexation of the PXRD data of complexes.**

| | $Eu(pfb)_3(BPhen)$ ·Solv | $Eu(pfb)_3(PyPhen)$ | $Yb(pfb)_3(DPPZ)$ | $Yb(pfb)_3(BDPZ)$ |
|---|---|---|---|---|
| Spacegroup | P-1 | | P-1 | P-1 |
| R-Bragg | | 0.077 | 0.144 | |
| Cell Volume ($Å^3$) | 2220.5(3) | 1600.65(6) | 2521.71(18) | 1921.4(2) |
| Lattice parameters | | | | |
| a (Å) | 12.5834(8) | 9.84466(16) | 15.9883(7) | 12.1354(9) |
| b (Å) | 13.6925(8) | 12.7929(2) | 11.2484(4) | 12.8209(9) |
| c (Å) | 13.8021(10) | 15.2582(3) | 14.8199(6) | 15.1333(9) |
| alpha (°) | 103.508(5) | 123.5485(14) | 106.987(3) | 63.257(4) |
| beta (°) | 83.582(6) | 89.9716(14) | 88.213(5) | 100.758(5) |
| gamma (°) | 77.146(5) | 88.4205(15) | 82.694(4) | 113.966(4) |

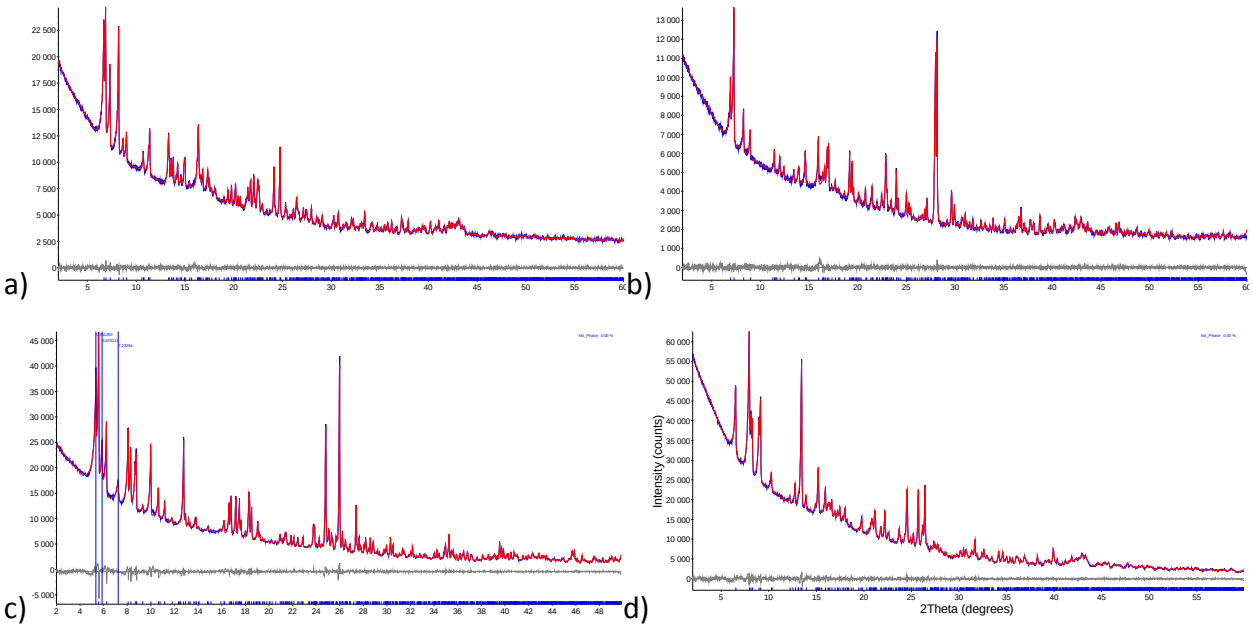
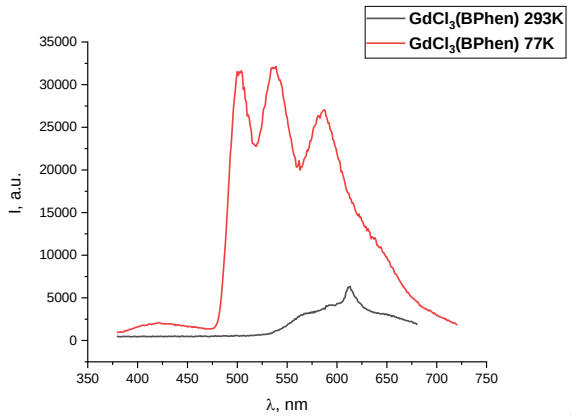
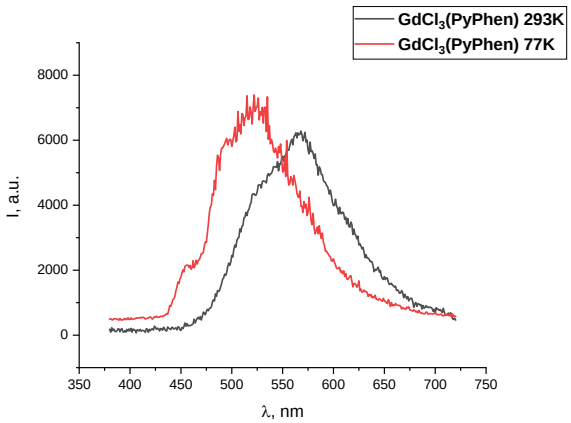



**Figure 1.** PXRD patterns of a) $Eu(pfb)_3(BPhen)\cdot Solv$, b) $Eu(pfb)_3(PyPhen)$, c) $Yb(pfb)_3(DPPZ)$, d) $Yb(pfb)_3(BDPZ)$.



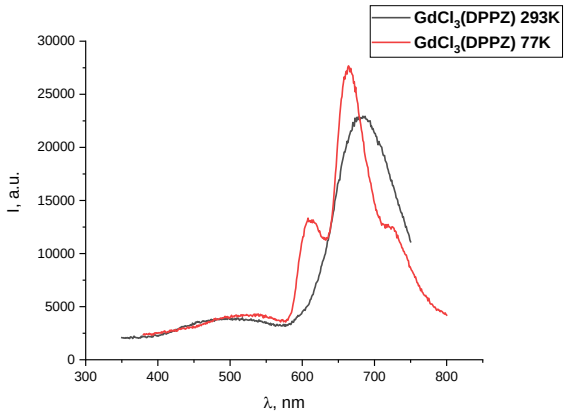

a)



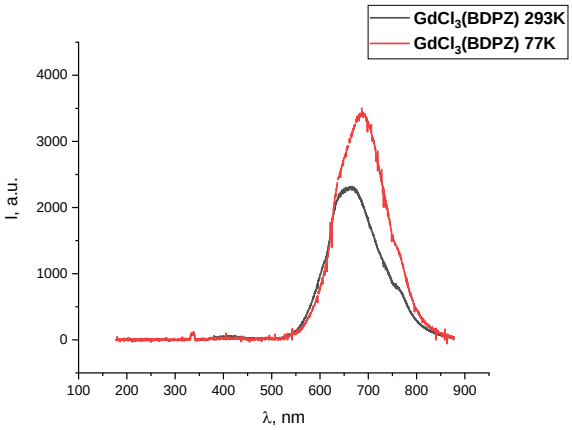

b)

$GdCl_3$(BPhen) $\lambda_{max}$ = 503 nm $T_1$ = 19900 $cm^{-1}$

$GdCl_3$(PyPhen) $\lambda_{max}$ = 456 nm $T_1$ = 21900 $cm^{-1}$




c)




d)

$GdCl_3$(DPPZ) $\lambda_{max}$ = 608 nm $T_1$ = 16400 $cm^{-1}$

$GdCl_3$(BDPZ) $\lambda_{max}$ = 715 nm $T_1$ = 14000 $cm^{-1}$

**Figure 2.** Luminescence spectra of gadolinium complexes a) $GdCl_3$(BPhen), b) $GdCl_3$(PyPhen), c) $GdCl_3$(DPPZ), d) $GdCl_3$(BDPZ) at 77K and 293 K for determining triplet state energies of the ligands.

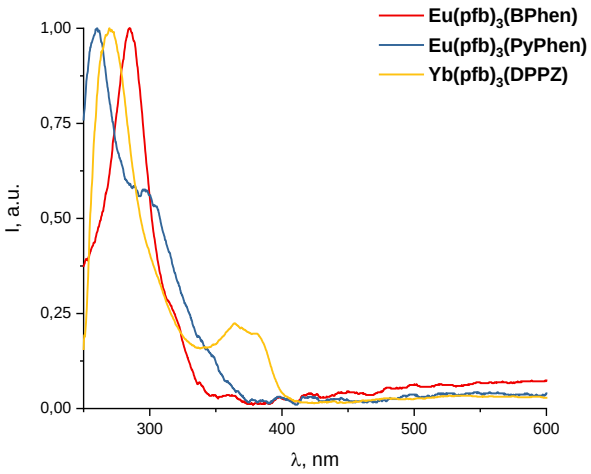
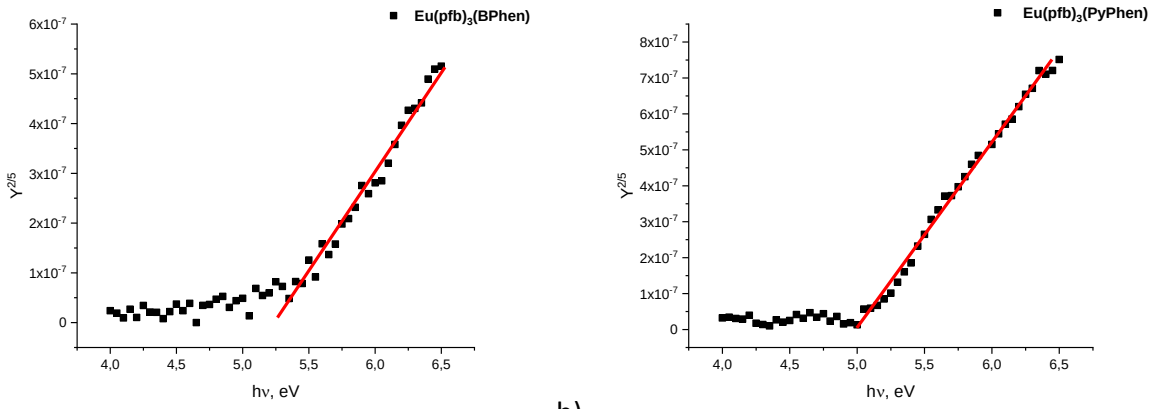



**Figure 3.** Absorbtion spectra of films $Eu(pfb)_3(BPhen)$, $Eu(pfb)_3(PyPhen)$, and $Yb(pfb)_3(DPPZ)$




a) b)

**Figure 4.** Photoemission yields of films a) $Eu(pfb)_3(BPhen)$ and b) $Eu(pfb)_3(PyPhen)$.