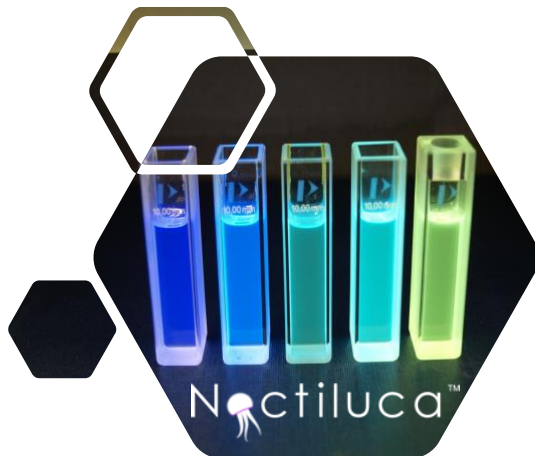


Fluorescence  
1<sup>st</sup>  
GEN  
Low cost  
Deep blue available  
High color purity  
Low Efficiency (25%)

Phosphorescence  
2<sup>nd</sup>  
GEN  
High cost  
Deep blue currently not available  
Low color purity  
High Efficiency (100%)

TADF  
3<sup>rd</sup>  
GEN  
Low cost  
Deep blue - under development  
Low color purity  
High Efficiency (100%)

Hyperfluorescence  
4<sup>th</sup>  
GEN  
Low cost  
Deep blue - under development  
High color purity  
High Efficiency (100%)



- Based in Torun (Poland)
- Focused on developing highly efficient emitters for OLED displays
- Engaged with tier-one partners as well as display leaders
- Home of leading technical experts

**Noctiluca** is a company that develops next generation OLED emitter materials – chemical compounds that form the core of OLED displays. These are used in TVs, smartphones, wearables and several other mainstream devices.

**Noctiluca's Team** has over 15 years of experience in both research and development projects, as well as in the production of organic and organometallic compounds from milligrams to multi-kilograms.

Our experience includes among others, high purity organometallic compounds of gallium, zirconium, tin, and indium ALD and CVD applications; Gratzel type dyes for DSSC applications; and other organic materials.

We have the necessary laboratory equipment for the synthesis of organic and organometallic compounds sensitive to air and moisture, reactors with a capacity of up to 50 L, industrial rotary evaporator, microreactors, and flow reactors, electrochemical reactors, etc. We have GC and GCMS, HPLC and HPLC MS, IR and UV-VIS spectrometers, as well as NMR (700 MHz, 400 MHz, and 300 MHz), ICP-MS, SEM, and TEM.

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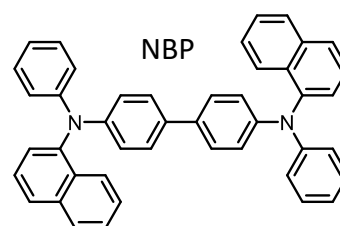
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There is a wide range of OLED materials, that Noctiluca provides:

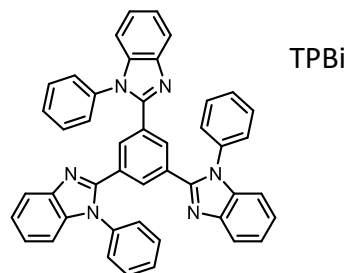
## I. Transport Layer Materials

Efficient transport of holes and electrons to the emissive layer that is important for the performance of the device. Thermal and electrochemical stability, as well as mobility properties drive the performance of the OLED.

I.1. Hole Transport Layer (HTL): HTL materials are mainly aromatic amines with high hole mobility properties like: F4TCNQ, CBP, NPB, mCP, TAPC, TCTA, mTDATA, TPD, TCP, 2-TNATA, BCBP, DPAVBi, TTPA and Tris-PCz, CzSi.



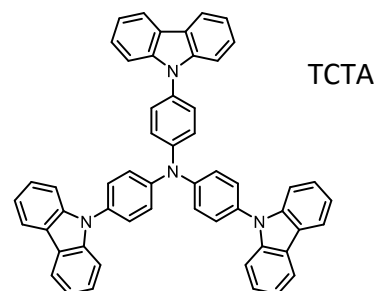
I.2. Electron Transport Layer (ETL): Electron deficient materials are used as ETL materials: TPBi, TmPyPB, PPT, B4PymPm, DPPS, B3PymPm, DPEPO, B2PymPm, B3PyPB, BTB, T2T and TSBF.



## 2. Injection layers

Materials which facilitate the injection of holes and electrons into HTL and ETL respectively, are crucial for device performance.

2.1. Hole Injection Layer (HIL): HIL materials improve the injection of holes from the anode into HTL by reducing the energy barrier between these layers. Most common HIL materials are: 2-TNATA, F4TCNQ, NPB, TCTA, mTDATA and TPD.



2.2. Electron Injection Layer (EIL): EIL materials reduce the energy barrier between the cathode and the ETL. One of the most frequently used EIL material is TPBi.

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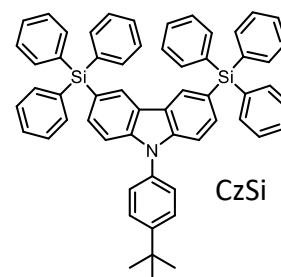
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### 3. Blocking layers

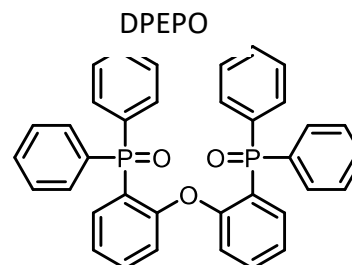
Excitons are confined within the emission layer by using respective HBL and EBL materials which greatly increase the performance of the OLED devices.

- 3.1. Hole Blocking Layer (HBL): These materials prevent from exciton leakage from emission layer to the ETL. Most popular HBL materials are: DPEPO, B3PyPB, BTB, TPBi, TmPyPB, B4PymPm, DPPS, B3PymPm and B2PymPm.
- 3.2. Electron Blocking Layer (EBL): These materials prevent exciton leakage from emission layer to the HTL. Most popular EBL materials are: TTPA and NPB.



### 4. Host materials

Dispersion of a dopant in a host is common for all four generations of OLED devices, especially for phosphorescent, TADF and Hyperfluorescent technologies. The choice of right host is crucial for the performance of the device. A new approach is to apply bipolar host which consists of donor and acceptor groups in a molecule – such structure of host has great influence on the stability and lifetime of the devices. Among the most frequently applied hosts are: CBP, T2T, mCP, TmPyPB, TAPC, TCTA, TPD, ADN, TCP, CzSi, mCBP, DPEPO, CDBP, TSBF, BCBP, BCPO (bipolar), mCPSOB (bipolar), BCzPh, PYD-2Cz (bipolar), 26DCzPPy (bipolar), 35DCzPPy (bipolar), Cab-Ph-TRZ (bipolar), PPT (bipolar).



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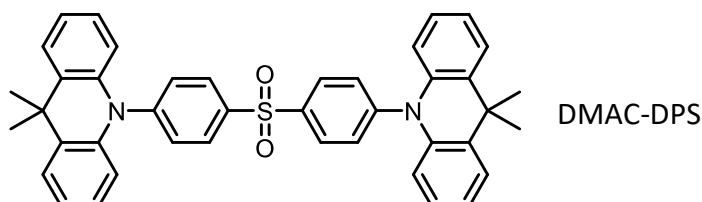
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Deep blue - under development  
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## 5. Dopants

Fluorescent and TADF materials emitting blue, green and yellow light, efficiently for OLED applications.

- 5.1. Blue: DPAVBi (Fluorescent), 4tCzBN (TADF), 2CzPN (TADF), 5CzBN (TADF), 5tCzBN (TADF), 4CzBN (TADF), DMAC-DPS (TADF).
- 5.2. Green: 4CzIPN (TADF), 4CzTPN (TADF), PXZ-DPS (TADF), DMAC-BP (TADF), TTPA (TADF).
- 5.3. Yellow: 4CzTPN-Me (TADF).



In addition, Noctiluca specializes in a wide array of **Organometallic products**.

**Please contact us for pricing and lead times.**

If you have not found a product you were looking for, please do reach out. Our team of experts have proven to be nimble in delivering high purity compounds for industrial partners in over 15 years. There is a solution to every chemical challenge and Noctiluca is up for the job.

contact  
[mnowak@noctiluca.eu](mailto:mnowak@noctiluca.eu)