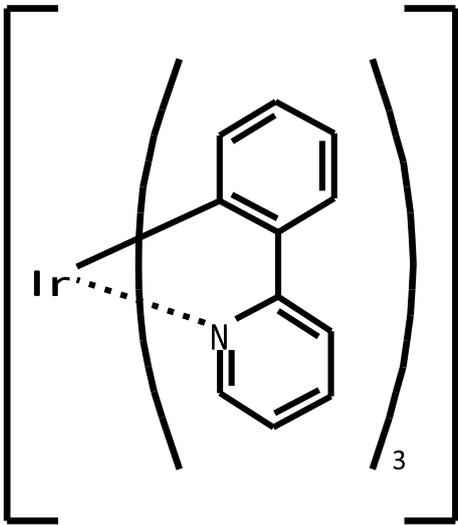
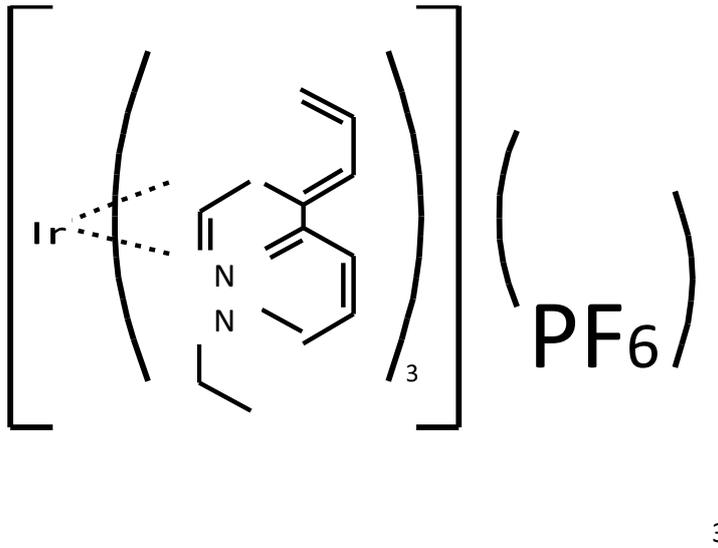
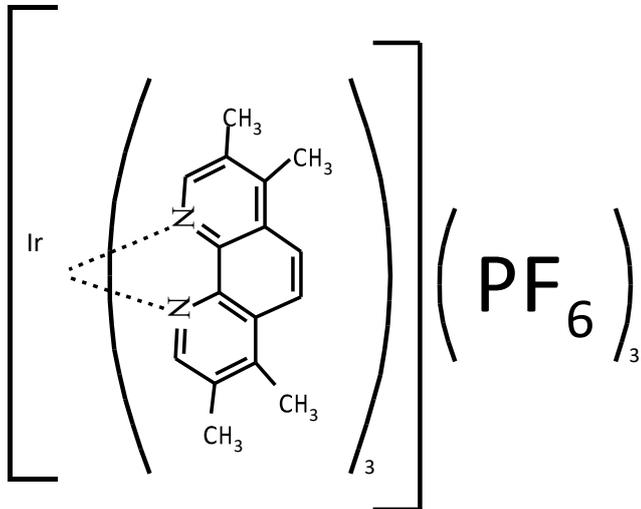
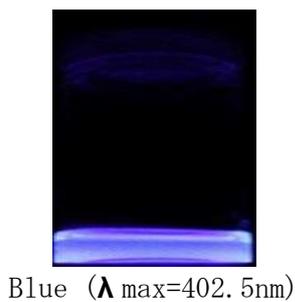
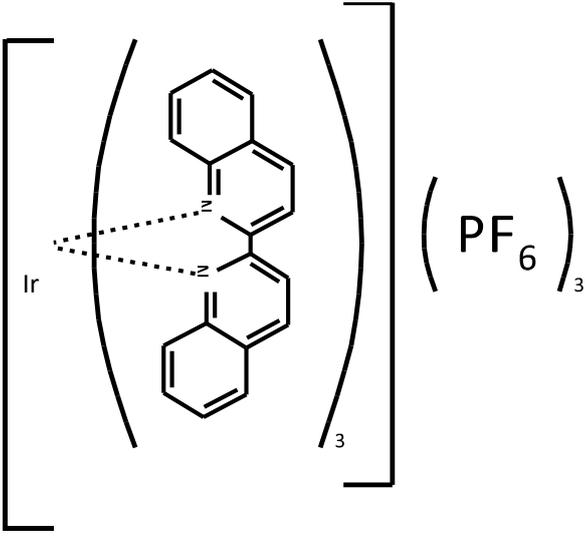
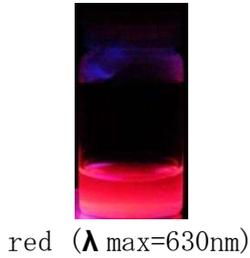


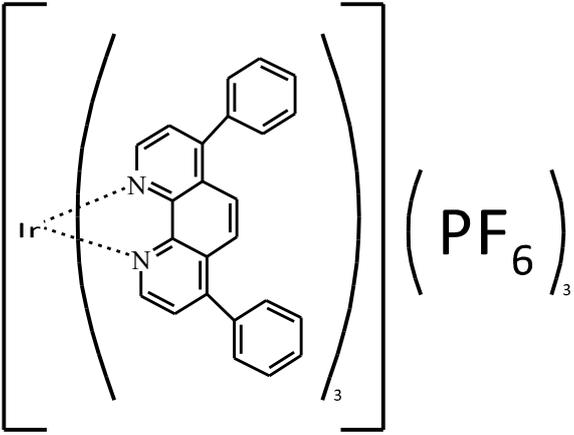
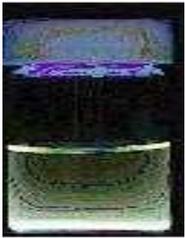
Iridium Complex

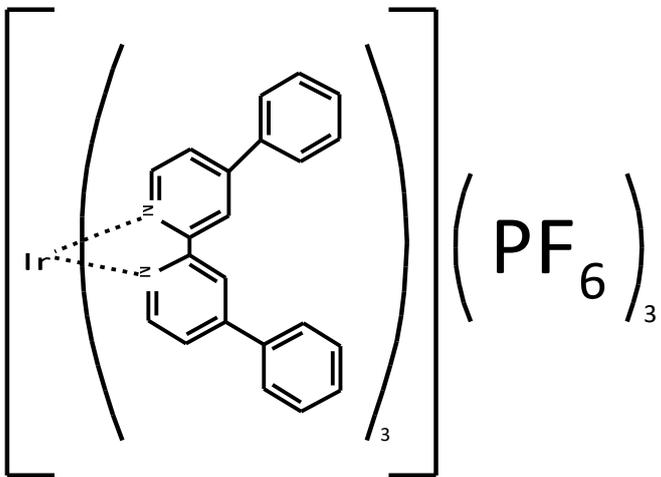
Complex name	Tris(2-phenylpyridinato) iridium(III)	
CAS No.	94928-86-6	
Abbreviation	Ir(ppy) ₃	
Molecular formula/weight	C ₃₃ H ₂₄ IrN ₃ 626. 779	
Form	Yellow powder	
Structural formula	Illumination color	
	 green ($\lambda_{\text{max}}=514\text{nm}$)	
<p>neutral, homoleptic cyclometalated complex. The three 2-phenylpyridine (ppy) ligands are deprotonated and coordinate to the iridium center, balancing its +3 charge.</p> <p>It can exist as two isomers: facial (fac) and meridional (mer). The fac isomer, where the three nitrogen atoms and three carbon atoms each occupy one face of the octahedron, is the one with high phosphorescent quantum yield and is the form typically referred to by this CAS number.</p> <p>Key Property: Ir(ppy)₃ is a benchmark green phosphorescent emitter. It exhibits strong luminescence, high efficiency, and good stability, making it a prototype for all subsequent cyclometalated iridium complexes.</p> <p>Its primary applications are in:</p> <ul style="list-style-type: none"> Organic Light-Emitting Diodes (OLEDs) as a fundamental green phosphorescent dopant. It is one of the most studied and successful OLED emitters. Light-Emitting Electrochemical Cells (LEECs). As a standard or catalyst in Photoredox Catalysis. A model compound in fundamental photophysical research 		

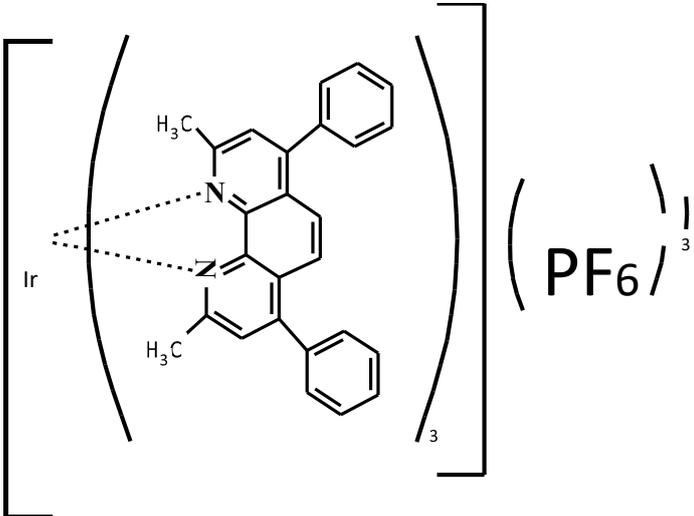
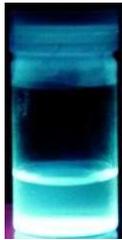
Complex name	Tris(2,2' -bipyridinato) iridium(III) trihexafluorophosphate	
CAS No.	68411-13-0	
Abbreviation	[Ir(bpy) ₃] (PF ₆) ₃	
Molecular formula/weight	C ₃₀ H ₂₄ F ₁₈ IrN ₆ P ₃ 1095.672	
Form	Yellow powder	
	Structural formula	Illumination color
	 <p>The structural formula shows an iridium (Ir) atom at the center, coordinated to three 2,2'-bipyridine (bpy) ligands. Each bpy ligand consists of two pyridine rings connected at the 2 and 2' positions. The Ir atom is coordinated to the nitrogen atoms of the three ligands. The complex is shown in brackets with a subscript 3, indicating three such cations. To the right, three hexafluorophosphate (PF₆)⁻ counterions are shown in parentheses, also with a subscript 3.</p>	 <p>Green ($\lambda_{\text{max}}=528\text{nm}$)</p>
<p>This compound is a highly important and widely used phosphorescent organometallic complex, famous for its strong greenish-yellow emission. It is extensively used in research areas like:</p> <ul style="list-style-type: none"> Organic Light-Emitting Diodes (OLEDs) Electrochemiluminescence (ECL) sensors Photoredox catalysis Luminescent probes 		

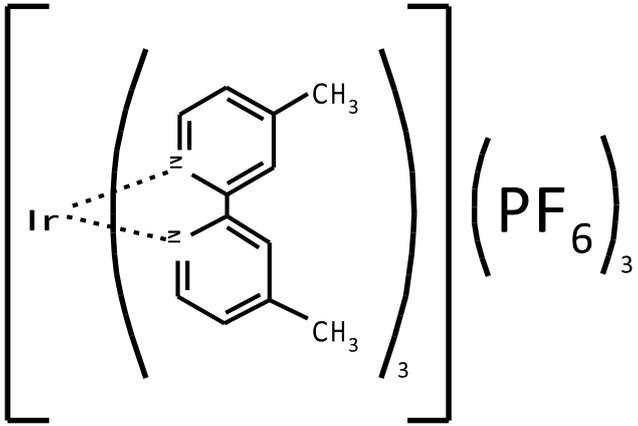
Complex name	Tris(3,4,7,8-tetramethyl-1,10-phenantrolinato) iridium(III) trihexafluorophosphate	
CAS No.	109789-00-4	
Abbreviation	[Ir(tmphen) ₃] (PF ₆) ₃	
Molecular formula/weight	C ₄₈ H ₄₈ F ₁₈ IrN ₆ P ₃ 1274.112	
Form	Charcoal gray powder	
Structural formula	Illumination color	
		
<p>This complex is a derivative of the well-known phenanthroline ligand, where methyl groups in the 3,4,7,8 positions create a more sterically hindered and electron-rich environment around the iridium center compared to the unsubstituted phenanthroline complex.</p> <p>Key Property: This compound is a highly efficient red-emitting phosphorescent complex. The methyl substitutions shift the emission to a longer wavelength (red) compared to the parent Ir(phen)₃³⁺ complex.</p> <p>It is primarily used in research, particularly in: Organic Light-Emitting Diodes (OLEDs) as a red phosphorescent emitter. Electrochemiluminescence (ECL) studies and sensors. Photophysical and photochemical research</p>		

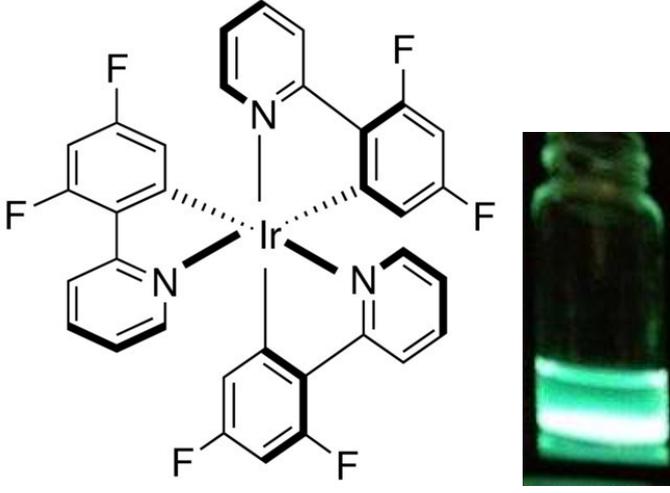
Complex name	Tris(2,2' -biquinolato) iridium(III) trihexafluorophosphate	
CAS No.	108349-49-9	
Abbreviation	[Ir(bqn) ₃] (PF ₆) ₃	
Molecular formula/weight	C ₅₄ H ₄₈ F ₁₈ IrN ₆ P ₃ 1408.126	
Form	Light brown powder	
	Structural formula	Illumination color
		
<p>The 2,2'-biquinoline (biq) ligand is a larger, more extended, and more π-delocalized analog of 2,2'-bipyridine (bpy). This structure leads to a significant red-shift in the absorption and emission properties of its metal complexes due to a lower energy π* orbital on the ligand.</p> <p>Key Property: This complex is known for its deep red to near-infrared (NIR) phosphorescent emission. The strong ligand field of the biq ligand results in a very low-energy triplet excited state.</p> <p>Its primary use is in specialized research areas, including:</p> <ul style="list-style-type: none"> Organic Light-Emitting Diodes (OLEDs) as a red-emitting dopant. Molecular probes and sensors that operate in the red/NIR region. Fundamental studies of photophysics in heavy-metal complexes with low-energy excited states 		

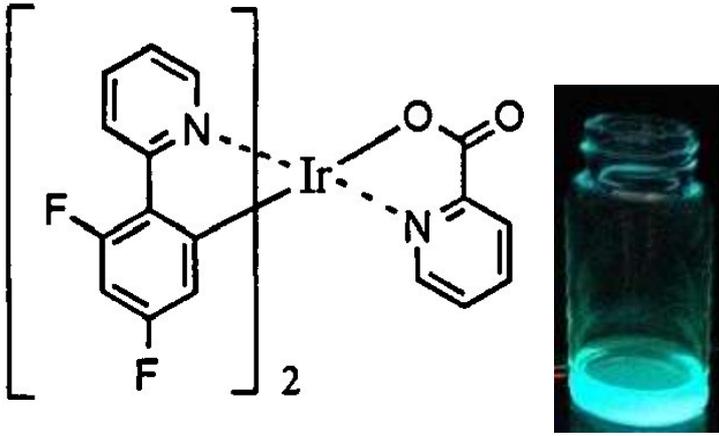
Complex name	Tris(4,7-diphenyl-1,10-phenanthroline) iridium(III) trihexafluorophosphate	
CAS No.	108349-51-3	
Abbreviation	[Ir(dpphen) ₃] (PF ₆) ₃	
Molecular formula/weight	C ₇₂ H ₄₂ F ₁₈ IrN ₆ P ₃ 1295.303	
Form	Brown powder	
	Structural formula	Illumination color
		 Green/yellow ($\lambda_{\text{max}}=539\text{nm}$)
<p>The 4,7-diphenyl-1,10-phenanthroline (dpp) ligand features bulky phenyl rings which extend the π-conjugation system. This significantly alters the electronic properties compared to the unsubstituted phenanthroline, leading to a red-shift in its light absorption and emission.</p> <p>Key Property: This complex is a prominent red-emitting phosphorescent compound. The phenyl substituents lower the energy of the ligand-centered π^* orbital, resulting in a lower energy (red-shifted) triplet state and emission.</p> <p>Its primary applications are in advanced research, including: Organic Light-Emitting Diodes (OLEDs) as a red phosphorescent dopant. Electrochemiluminescence (ECL) systems, where it is a very common and efficient emitter (often used as a standard). Luminescent sensors and biological labeling</p>		

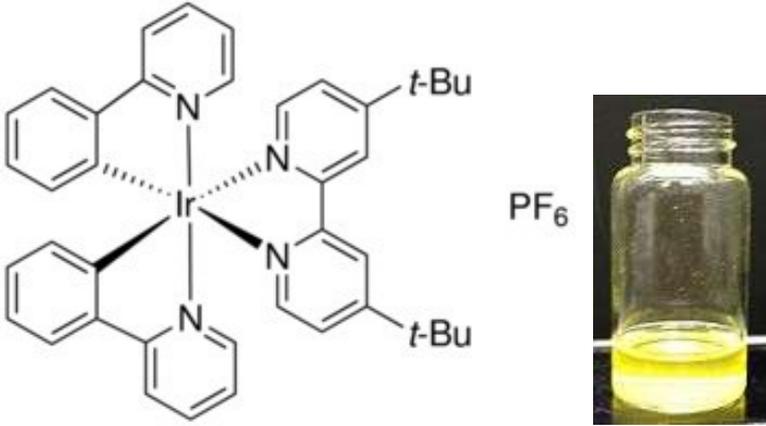
Complex name	Tris(4,4'-diphenyl-2,2'-bipyridinato) iridium(III) trihexafluorophosphate	
CAS No.	509599-38-8	
Abbreviation	[Ir(dpbpy) ₃] (PF ₆) ₃	
Molecular formula/weight	C ₆₆ H ₄₈ F ₁₈ IrN ₆ P ₃ 1490.310	
Form	Brown powder	
	Structural formula	Illumination color
		 Green ($\lambda_{\text{max}}=506\text{nm}$)
<p>The 4,4'-diphenyl-2,2'-bipyridine (dpbpy) ligand is a widely used structure in coordination chemistry. The phenyl rings at the 4 and 4' positions extend the π-conjugation, which stabilizes the ligand-centered π^* orbital. This results in a red-shift of the absorption and emission compared to the parent 2,2'-bipyridine (bpy) complex.</p> <p>Key Property: This complex is a well-known orange to red-emitting phosphorescent compound. The exact color can vary from orange to red depending on the specific environment and the degree of conjugation.</p> <p>Its primary applications are in research, particularly in:</p> <ul style="list-style-type: none"> Organic Light-Emitting Diodes (OLEDs) as a phosphorescent dopant. Light-emitting Electrochemical Cells (LEECs). Electrochemiluminescence (ECL) studies and biosensing 		

Complex name	Tris(2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline) iridium(III) trihexafluorophosphate	
CAS No.	108349-52-4	
Abbreviation	[Ir(dmdpphen) ₃] (PF ₆) ₃	
Molecular formula/weight	C ₇₂ H ₆₀ F ₁₈ IrN ₆ P ₃ 1636.419	
Form	Charcoal gray powder	
	Structural formula	Illumination color
		 Blue ($\lambda_{\text{max}}=446.5\text{nm}$)
<p>This complex uses the well-known ligand bathocuproine (bcp), which is the common name for 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline. The methyl groups in the 2 and 9 positions provide significant steric hindrance, which prevents three of these bulky ligands from coordinating in a planar fashion around the metal center. This forces a more distorted, chiral geometry (a "helical" or propeller-like arrangement).</p> <p>Key Property: This complex is a highly studied red-emitting phosphorescent compound. The steric effects from the methyl groups can influence the emission efficiency and lifetime. It is a classic example of a complex with a sterically hindered ligand set.</p> <p>Its primary applications are in research, including:</p> <ul style="list-style-type: none"> Organic Light-Emitting Diodes (OLEDs) as a red phosphorescent dopant. Electrochemiluminescence (ECL) studies. Fundamental photophysical studies of sterically constrained complexes 		

Complex name	Tris(4,4'-dimethyl-2,2'-bipyridinato) iridium(III) trihexafluorophosphate	
CAS No.	223201-42-5.	
Abbreviation	[Ir(dmbpy) ₃] (PF ₆) ₃	
Molecular formula/weight	C ₃₆ H ₃₆ F ₁₈ IrN ₆ P ₃ 1179.833	
Form	Yellow powder	
Structural formula	Illumination color	
	 green (λ _{max} =525nm)	
<p>The 4,4'-dimethyl-2,2'-bipyridine (dmbpy) ligand features electron-donating methyl groups. These substituents increase the electron density on the bipyridine system, which raises the energy of the ligand-centered π* orbital. This electronic effect influences the photophysical properties of the resulting iridium complex.</p> <p>Key Property: This complex is a green-emitting phosphorescent compound. The electron-donating methyl groups typically cause a slight blue-shift (higher energy) in the emission compared to the parent complex, Tris(2,2'-bipyridine)iridium(III) [Ir(bpy)₃].</p> <p>Its primary applications are in research, including:</p> <ul style="list-style-type: none"> Organic Light-Emitting Diodes (OLEDs) as a phosphorescent emitter or host material component. Electrochemiluminescence (ECL) studies. Photocatalysis and photophysical studies as a molecular probe 		

Complex name	Tris[2-(2,4-difluorophenyl)pyridinato]iridium(III)
CAS No.	867433-28-5
Abbreviation	$[\text{Ir}(\text{F}_2\text{ppy})_3]$
Molecular formula/weight	$\text{C}_{33}\text{H}_{18}\text{F}_6\text{IrN}_3$ 762.72
Form	Yellow powder, neutral
Structural formula	
 <p>The image shows the chemical structure of Ir(F₂ppy)₃ and a photograph of its phosphorescence. The structure is a central iridium atom coordinated to three bidentate ligands. Each ligand consists of a pyridine ring coordinated to the iridium through its nitrogen atom and a 2,4-difluorophenyl ring coordinated through the carbon atom at the 2-position of the pyridine ring. The phenyl rings have fluorine atoms at the 2 and 4 positions. To the right of the structure is a photograph of a vial containing a yellow powder that exhibits a bright green phosphorescence under dark conditions.</p>	
<p>Neutral Complex: Unlike all the previous entries, this complex is neutral. It does not have a counterion like PF_6^-. The three anionic ligands (from the deprotonated 2-(2,4-difluorophenyl)pyridine) directly balance the Ir(III) center's +3 charge. Therefore, the name and CAS number refer to the neutral molecule $\text{Ir}(\text{F}_2\text{ppy})_3$. This is one of the most important classes of iridium complexes, known as heteroleptic cyclometalated complexes. The 2-(2,4-difluorophenyl)pyridine (F_2ppy) ligand is a cyclometalating ligand, where the iridium forms a bond to both the pyridine nitrogen and the phenyl carbon atom. The strong electron-withdrawing fluorine atoms on the phenyl ring significantly tune the electronic properties.</p> <p>Key Property: $\text{Ir}(\text{F}_2\text{ppy})_3$ is famous for being an extremely efficient and stable sky-blue phosphorescent emitter. It is a benchmark material in the field of OLED</p>	

Complex name	Bis[2-(4,6-difluorophenyl)pyridinato-C2,N] (picolinato) iridium(III)
CAS No.	686509-26-6
Abbreviation	FIrpic
Molecular formula/weight	$C_{28}H_{16}F_4IrN_3O_2$ 694.665
Form	Yellow powder
Structural formula	
 <p>The image shows the chemical structure of the FIrpic complex. It consists of an iridium (Ir) center coordinated to two 2-(4,6-difluorophenyl)pyridine (dfppy) ligands and one picolinato ligand. The dfppy ligands are shown in brackets with a subscript of 2, indicating two such ligands are present. The picolinato ligand is shown as a pyridine ring with a carboxylate group (-COO-) coordinated to the iridium center. To the right of the structure is a photograph of a glass vial containing a yellow powder that exhibits a bright blue phosphorescence under dark conditions.</p>	
<p>This is a heteroleptic complex, meaning it has two different types of ligands. It has two anionic cyclometalating ligands: 2-(4,6-difluorophenyl)pyridine (4,6-dfppy). The fluorine atoms are crucial for achieving the high-energy (blue) emission. It has one anionic ancillary ligand: picolinic acid (picolinato). This ligand completes the coordination sphere around the iridium center and helps tune the stability and electronic properties of the complex.</p> <p>Key Property: FIrpic is a benchmark sky-blue phosphorescent emitter. Its emission peaks around 470-480 nm (blue) and 495-500 nm (green), giving it its characteristic sky-blue color. It was one of the first efficient blue phosphors to be widely adopted in OLED research and development.</p> <p>Its primary application is in:</p> <p>Organic Light-Emitting Diodes (OLEDs) as a crucial blue phosphorescent dopant, especially in the creation of white light when combined with red and green emitters.</p> <p>It is also used in light-emitting electrochemical cells (LEECs) and other photonic device</p>	

Complex name	(4,4'-Di-tert-butyl-2,2'-bipyridine)bis[(2-pyridinyl)phenyl]iridium(III) Hexafluorophosphate
CAS No.	676525-77-2
Abbreviation	[Ir(dtbbpy)(ppy) ₂][PF ₆]
Molecular formula/weight	C ₄₀ H ₄₀ F ₆ IrN ₄ P 913.97
Form	Yellow powder
Structural formula	
	
<p>This is a cationic heteroleptic complex.</p> <p>It has two anionic cyclometalating ligands: 2-phenylpyridine (ppy), which are responsible for the primary luminescent properties.</p> <p>It has one neutral ancillary ligand: 4,4'-di-tert-butyl-2,2'-bipyridine (dtbbpy). The tert-butyl groups serve two key purposes:</p> <p>They improve the solubility of the complex in organic solvents.</p> <p>They provide steric bulk that can influence packing in the solid state and help prevent quenching processes.</p> <p>Key Property: This complex is a highly studied yellow-green to green-emitting phosphorescent compound. The presence of the ppy ligands gives it strong luminescence, while the dtbbpy ligand makes it highly soluble and easy to process. It is also an excellent photosensitizer and redox-active species.</p> <p>Its primary applications are in research, including:</p> <p>Light-Emitting Electrochemical Cells (LEECs), where it is a very common and efficient emitter.</p> <p>Organic Light-Emitting Diodes (OLEDs).</p> <p>Photoredox Catalysis, as a versatile photocatalyst.</p> <p>Electrochemiluminescence (ECL) sensors and studies</p>	