

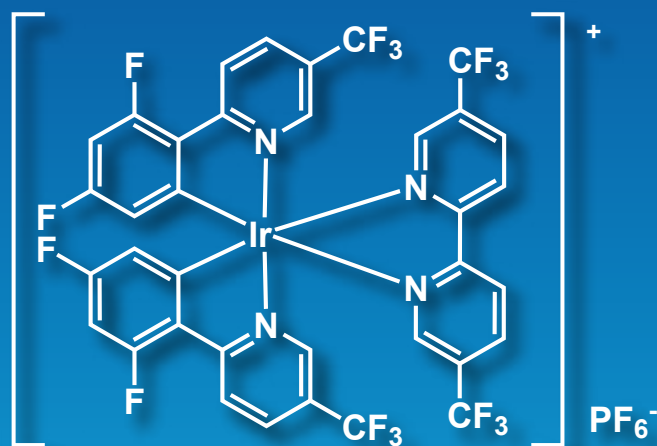
New

CHEMISTRY

MATERIALS



Iridium Photoredox Catalyst with Highly Oxidizing Excited State



[Ir(dFCF₃ppy)₂-(5,5'-dCF₃bpy)]PF₆
100mg / 500mg
[B6451]

Advantages

- Highly oxidizing excited state, compared to conventional iridium catalysts
- Redox potentials (vs. SCE) ¹⁾

PC^{*}/PC⁻ : +1.68 V

PC⁺/PC^{*} : -0.43 V

PC⁺/PC : +1.94 V

PC/PC⁻ : -0.69 V

Applications

- 1) Catalytic Carbocation Generation Enabled by the Mesolytic Cleavage of Alkoxyamine Radical Cations
Q. Zhu, E. C. Gentry, R. R. Knowles, *Angew. Chem. Int. Ed.* **2016**, *55*, 9969.
<https://doi.org/10.1002/anie.201604619>
- 2) Arylsulfonylacetamides as bifunctional reagents for alkene aminoarylation
T. M. Monos, R. C. McAtee, C. R. J. Stephenson, *Science* **2018**, *361*, 1369.
<https://doi.org/10.1126/science.aat2117>
- 3) A Redox Strategy for Light-Driven, Out-of-Equilibrium Isomerizations and Application to Catalytic C-C Bond Cleavage Reactions
E. Ota, H. Wang, N. L. Frye, R. R. Knowles, *J. Am. Chem. Soc.* **2019**, *141*, 1457.
<https://doi.org/10.1021/jacs.8b12552>
- 4) Direct Access to α -Aminosilanes Enabled by Visible-Light-Mediated Multicomponent Radical Cross-Coupling
X. Yu, C. G. Daniliuc, F. A. Alasmay, A. Studer, *Angew. Chem. Int. Ed.* **2021**, *60*, 23335.
<https://doi.org/10.1002/anie.202109252>
- 5) Highly selective single and multiple deuteration of unactivated C(sp³)-H bonds
N. Li, J. Li, M. Qin, J. Li, J. Han, C. Zhu, W. Li, J. Xie, *Nat. Commun.* **2022**, *13*, 4224.
<https://doi.org/10.1038/s41467-022-31956-3>

For further information please refer to our website at www.TCIchemicals.com.

TCI photoredox



Iridium Photoredox Catalyst with Highly Oxidizing Excited State

Other Photoredox Catalysts and their redox potentials

Ir[dF(CF₃)ppy]₂(bpy)PF₆ PC ^{*/} /PC ⁻ : +1.32 V; PC ⁺ /PC: +1.69 V; PC/PC ⁻ : -1.37 V; PC ⁺ /PC*: -1.00 V (vs. SCE) ⁶⁾	200mg / 1g [B6161]
[Ir[dF(CF₃)ppy]₂(dtbbpy)]PF₆ PC ^{*/} /PC ⁻ : +1.21 V; PC ⁺ /PC: +1.69 V; PC/PC ⁻ : -1.37 V; PC ⁺ /PC*: -0.89 V (vs. SCE) ⁶⁾	200mg / 1g [D5817]
[Ir(dF(Me)ppy)₂(dtbbpy)]PF₆ PC ^{*/} /PC ⁻ : +0.99 V; PC/PC ⁻ : -1.41V; (vs. SCE) ⁷⁾	200mg / 1g [B6254]
Ir[(ppy)₂(dtbbpy)]PF₆ PC ^{*/} /PC ⁻ : +0.66 V; PC ⁺ /PC: +1.21 V; PC/PC ⁻ : -1.51 V; PC ⁺ /PC*: -0.96 V (vs. SCE) ⁶⁾	200mg [D4887]
Ir(ppy)₃	200mg / 1g [T3716]
Ir(ppy)₃ (purified by sublimation) PC ^{*/} /PC ⁻ : +0.31 V; PC ⁺ /PC: +0.77 V; PC/PC ⁻ : -2.19 V; PC ⁺ /PC*: -1.73 V (vs. SCE) ⁸⁾	200mg [T1946]
Ru(bpy)₃(PF₆)₂	1g [T3435]
Ru(bpy)₃Cl₂ Hexahydrate PC ^{*/} /PC ⁻ : +0.77 V; PC ⁺ /PC: +1.29 V; PC/PC ⁻ : -1.33 V; PC ⁺ /PC*: -0.81 V (vs. SCE) ⁸⁾	1g / 5g [T1655]
[Ru(phen)₃](PF₆)₂ PC ^{*/} /PC ⁻ : +0.82 V; PC ⁺ /PC: +1.26 V; PC/PC ⁻ : -1.36 V; PC ⁺ /PC*: -0.87 V (vs. SCE) ⁸⁾	200mg / 1g [T3208]
peri-Xanthenoxanthene PC ^{*/} /PC: +0.82 V; PC ⁺ /PC*: -1.76 V (vs. SCE) ⁹⁾	1g [X0083]
10-Phenylphenothiazine (= PTH) PC ^{*/} /PC ⁻ : +0.68 V; PC ⁺ /PC*: -2.1 V, -1.7 V(T) (vs. SCE) ¹⁰⁾	1g / 5g [P2470]
9-Mesityl-10-methylacridinium Perchlorate PC ^{*/} /PC ⁻ : +2.06 V; PC ⁺ /PC: -0.57 V (vs. SCE) ¹¹⁾	1g / 5g [M1774]
Eosin Y PC ^{*/} /PC ⁻ : +0.83 V; PC ⁺ /PC: +0.78 V; PC/PC ⁻ : -1.06; PC ⁺ /PC*: -1.11 (vs. SCE) ¹⁰⁾	25g [T0035]
2,4,6-Triphenylpyrylium Tetrafluoroborate PC ^{*/} /PC ⁻ : +2.3 V; PC ⁺ /PC: -0.35 V (vs. SCE) ¹¹⁾	1g [T3968]

- References**
- 6) *Inorg. Chem. Front.* **2014**, *1*, 562.
 - 7) *ACS Catal.* **2020**, *10*, 11712.
 - 8) *Chem. Rev.* **2013**, *113*, 5322.
 - 9) *Nat. Commun.* **2021**, *12*, 429.
 - 10) *Chem. Commun.* **2022**, *58*, 1263.
 - 11) MacMillan lab's photocatalysts chart

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