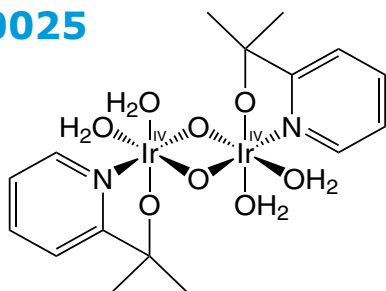
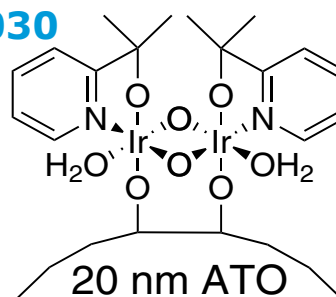


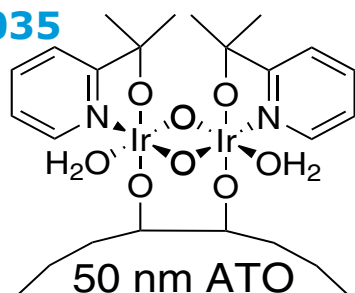
77-0025



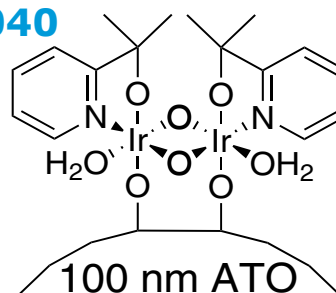
77-0030



77-0035



77-0040



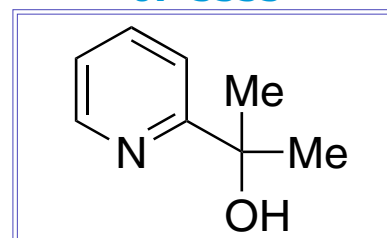
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US Patent Publication No. US20150065339 A1.

Product #	Description	Sizes
27-0477	Cobalt-dppe heterogeneous water oxidation catalyst (~17%-Co)	100mg 500mg
77-0025	[2-(Pyridine-2-yl)-2-propanato]iridium(IV) dimer solution 97% (1 mM in 0.1 Molar aqueous NaIO ₃)	10ml 50ml
77-0030	Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)	250mg 1g
77-0035	Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 50 nm (conductive and acid-stable)	250mg 1g
77-0040	Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 100 nm (conductive and acid-stable)	250mg 1g
07-3333	2-(Pyridine-2-yl)propan-2-ol, min. 95% pyalc	100mg 500mg 2g

Applications:

- Oxidation catalysis
- Wastewater remediation
- Corrosion resistance
- ORR scaffold in fuel cells
- OER scaffold in electrolysis

Ligand also available: **07-3333**



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Cobalt Catalyst and Nitrogen Ligand

27-0477	Cobalt-dppe heterogeneous water oxidation catalyst (~17%-Co) (C ₂₆ H ₂₄ CoP ₂); light-brown powdr.	100mg 500mg
07-3333	2-(Pyridine-2-yl)propan-2-ol, min. 95% pycal (C ₈ H ₁₁ NO); F.W. 137.18; white xtl.	100mg 500mg 2g

Molecular Iridium Monolayer

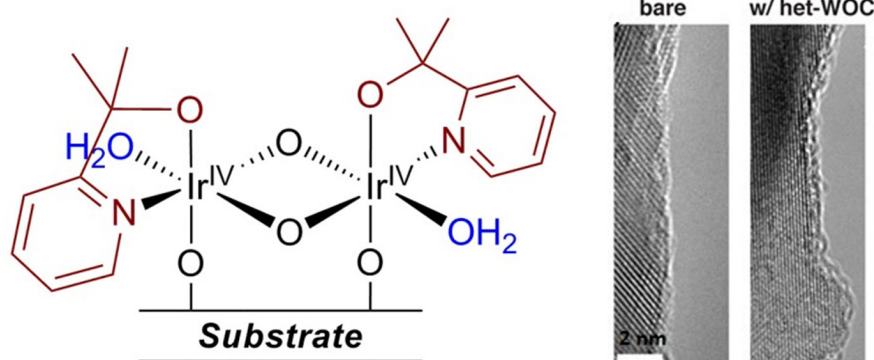
77-0025	2-(pyridine-2-yl)-2-propanato]iridium(IV) dimer solution 97% (1 mM in 0.1 Molar aqueous NaIO₃) (C ₁₆ H ₂₈ Ir ₂ N ₂ O ₈); F.W. 728.84; blue liq.	10ml 50ml
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Standard Operating Procedure:

Heterogenization of the material is straightforward and can be performed in the following conditions: in air, at ambient temperature and without requiring additives, applied potential or other treatments. For most carbon-based or metal oxide substrates:

1. Dip substrate in het-WOC deposition solution (or disperse powders, if powder).
2. Wait 4-12 hours (typically overnight).
3. Remove substrate from solution (or filter out powder) and rinse with clean water.

This will cause the monolayer Ir material to be deposited on the substrate, with a surface structure as shown¹ (TEM image on iron oxide shown to the right):



The het-WOC deposition solution may be diluted in order to increase its coverage over large substrates. As stated in the SDS, the het-WOC deposition solution is mostly comprised of water, therefore dilution with water is best. It can also be re-used repeatedly to load multiple substrates with the Ir monolayer. Each loading uses only a small amount of the Ir present in solution, although this is dependent on the surface area of the substrate.

References:

1. *J. Am. Chem. Soc.*, **2013**, 135, 10837.
2. *J. Am. Chem. Soc.*, **2014**, 136, 13826.
3. *Nat. Commun.*, **2015**, 6, 6469.
4. *Angew. Chem. Int. Ed.*, **2015**, 54, 11428.
5. *Energy Environ. Sci.*, **2016**, 9, 1794.

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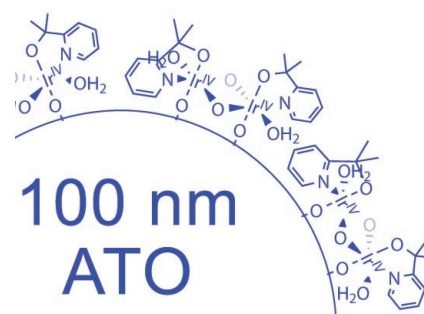
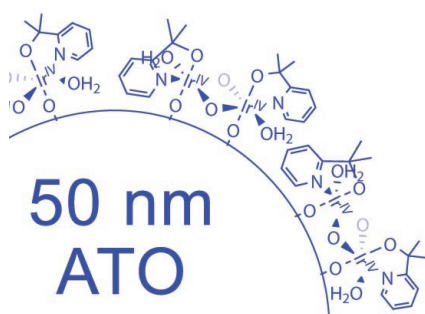
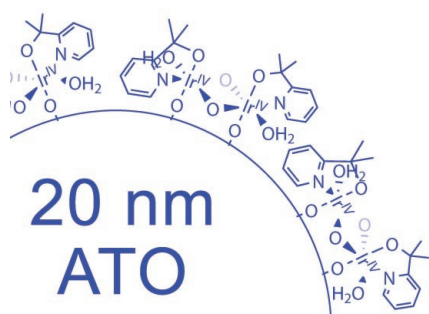
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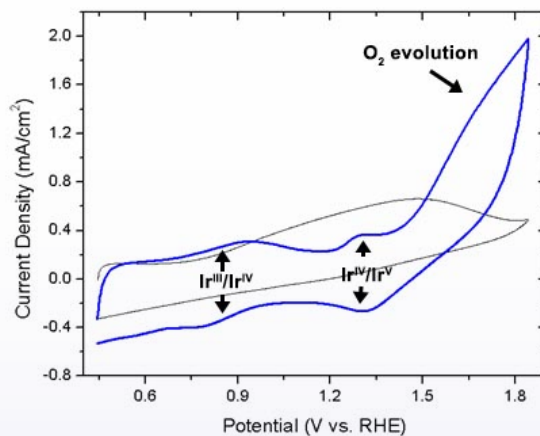
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Acid Stable Iridium-Decorated Conductive Oxides



Product Number	Product Description	Particle Size	BET Surface area	Resisitivity
77-0030	Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 20 nm (conductive and acid-stable)	20 nm	50 - 60 m ² /g	0.3 - 0.7 Ω·cm
77-0035	Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 50 nm (conductive and acid-stable)	50 nm	40 - 50 m ² /g	0.05 - 0.08 Ω·cm
77-0040	Antimony Tin Oxide/Iridium Het-WOC core/shell nanopowder, 100 nm (conductive and acid-stable)	100 nm	5 - 10 m ² /g	0.05 - 0.08 Ω·cm



Cyclic voltammogram of 50 nm ATO/het-WOC core/shell nanopowder operating in a test electrolyzer (built-in Hg/HgSO₄ reference) for oxygen evolution (blue) compared to a bare 50 nm ATO control (grey). Redox features of the molecular iridium species are present, as well as the catalytic wave for oxygen evolution. Activity persists for over 90 days.

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