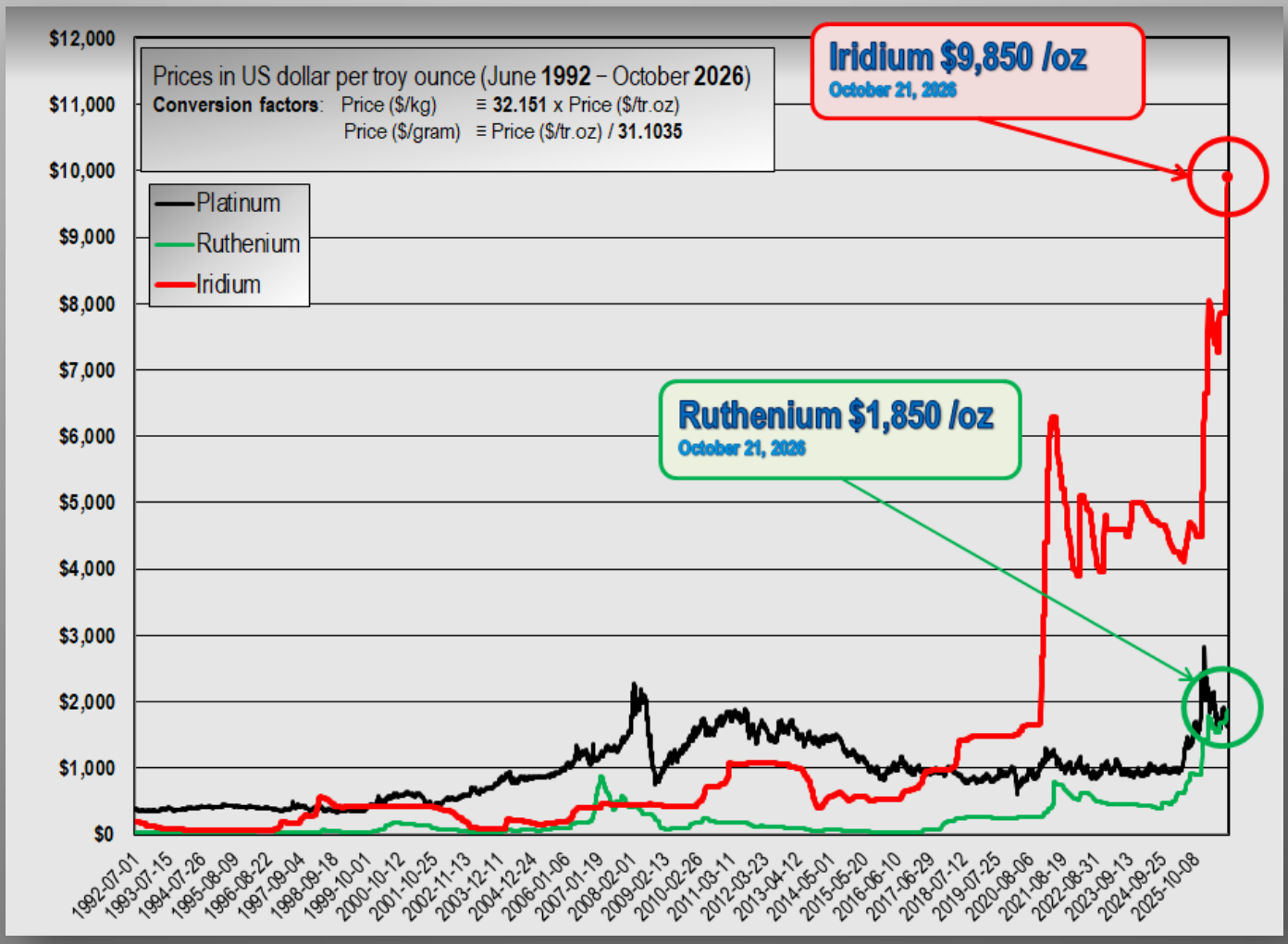
MIXED METAL OXIDE (MMO) ANODES ARE NOW UNSALEABLE!

THE UNBEARABLE PRICE OF IRIDIUM (AND RUTHENIUM)

by François Cardarelli



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HOW TO ALLEVIATE THIS PROBLEM FROM THE MANUFACTURER PROSPECTIVE

OPTIONS	PRO	CONS
Refurbishing spent MMO anodes	❑ Benefits from the residual coating ❑ Mitigate costs for the client	❑ Limited number of re-coatings. ❑ Lower performances after the third
Strip coatings from anodes and synthesis of precursors to prepare a new MMO anode	❑ Avoid buying precursors sold several times the price of iridium ❑ Recovery of Ti metal	❑ Requires knowledge of the extractive chemistry of PGMs ❑ Not sustainable on the long term
Strip coatings from MMO anode and sell the iridium oxide/sponge to refiners	❑ Fast cash back ❑ Reduce backlog	❑ Erodes the client base ❑ Reduces the future supply
Offer alternatives to the client	Cheaper anodes: Platinum, Lead, Graphite (for Ru)	❑ Lower performances

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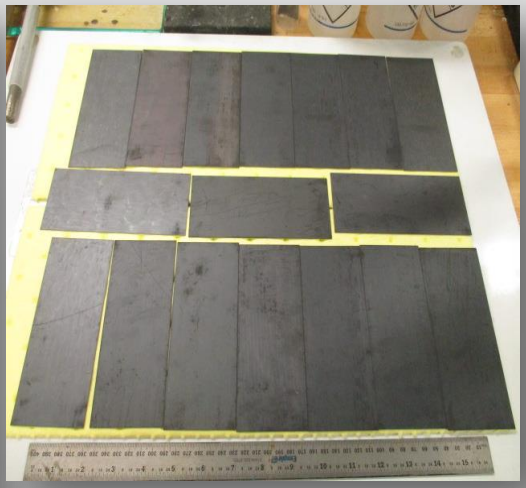
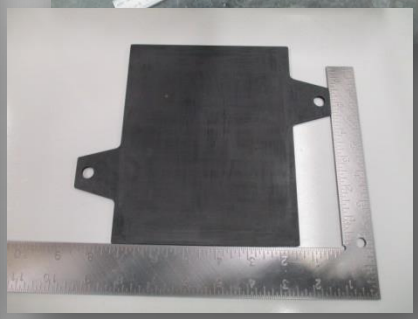
OPTION 1: REFURBISHING SPENT MMO ANODES





- It was attractive when iridium went from $2,000 to around $4,000/oz overnight
- It is not attractive anymore at current iridium pricing of $9,850/oz !
- The current cost of precursor offsets all the benefits of refurbishing vs. preparing a brand new MMO anode

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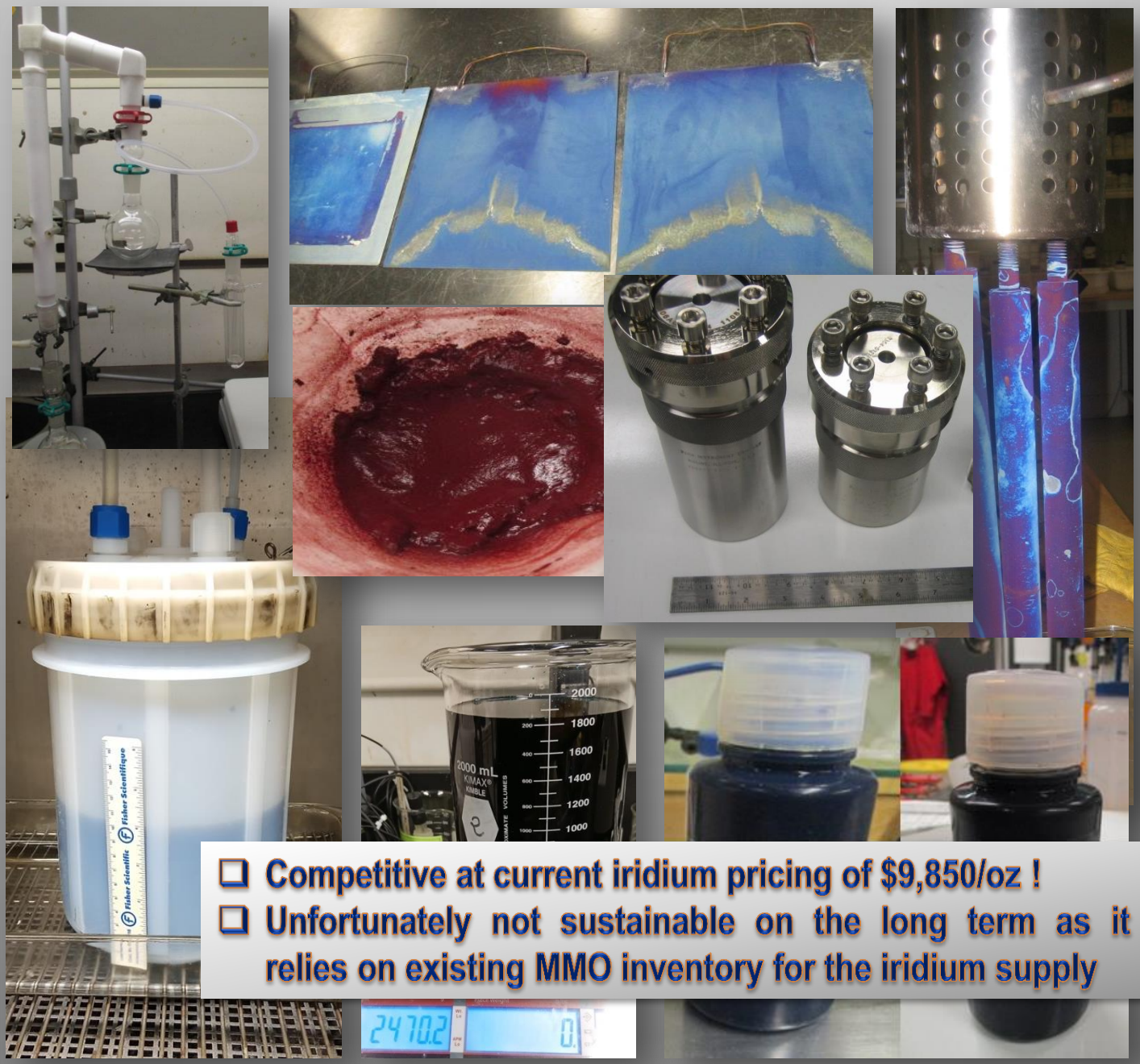
OPTION 2: STRIPPING THE MMO COATING & SYNTHESIS OF A NEW IRIDIUM PRECURSOR



- Competitive at current iridium pricing of $9,850/oz !
- Unfortunately not sustainable on the long term as it relies on existing MMO inventory for the iridium supply

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REALISTIC (HOPEFULLY TEMPORARY) SOLUTION FOR US: OPTION 3

- ❑ RIGHT NOW IT IS MORE PROFITABLE TO STRIP THE MMO COATING
- ❑ RECYCLE THE BARE TITANIUM METAL STOCK
- ❑ SELL THE IRIDIUM OXIDE/SPONGE TO REFINERS
- ❑ **RATHER THAN REFURBISHING A SPENT OR SELLING A NEW MMO ANODES!!!!**

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