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Ammonia oxidation enhancement on square-wave treated facet selective Pt/Ir particles

IRG I: Life Support Systems

The use of water for NASA expedition is limited, therefore is important the reuse of the water waste. Urine is one of the most water wastes present. Urease is an enzyme that degrades urea to ammonia and CO₂, where ammonia can be oxidized with a metal catalytic. Platinum is a transition metal that has been used for catalytic activity. Electrodeposited and microemulsion platinum particles have been used for ammonia oxidation. Tetrahedral (THH) platinum particles have shown an enhancement for small organic fuels, but have not been used for ammonia oxidation. The addition of iridium to platinum enhances the electrocatalytic activity. Iridium has been used as microemulsion for ammonia oxidation, but not as tetrahedral shape. The synthesis of tetrahedral particles is through the use of square wave voltammetry treatment on electrodeposited metal (platinum and/or iridium) particles on a carbon surface. Our work will involve the optimization of the synthesis of tetrahedral particles for platinum and iridium, and for this way show an enhancement of ammonia oxidation.

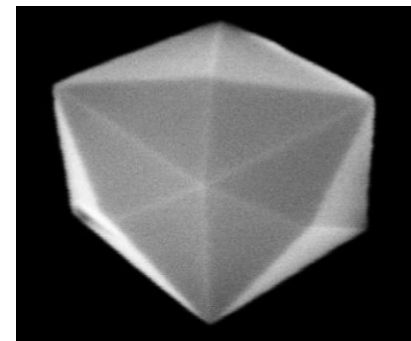


Figure of SEM image of THH Pt
Na Tian et.al., "Science" 316 (207) 732

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Posters presentation:

Tetrahedral Platinum Particles Electro-synthesized On Boron-doped Diamond Films
Ammonia and methanol oxidation on square-wave treated Pt deposited on BDD electrodes