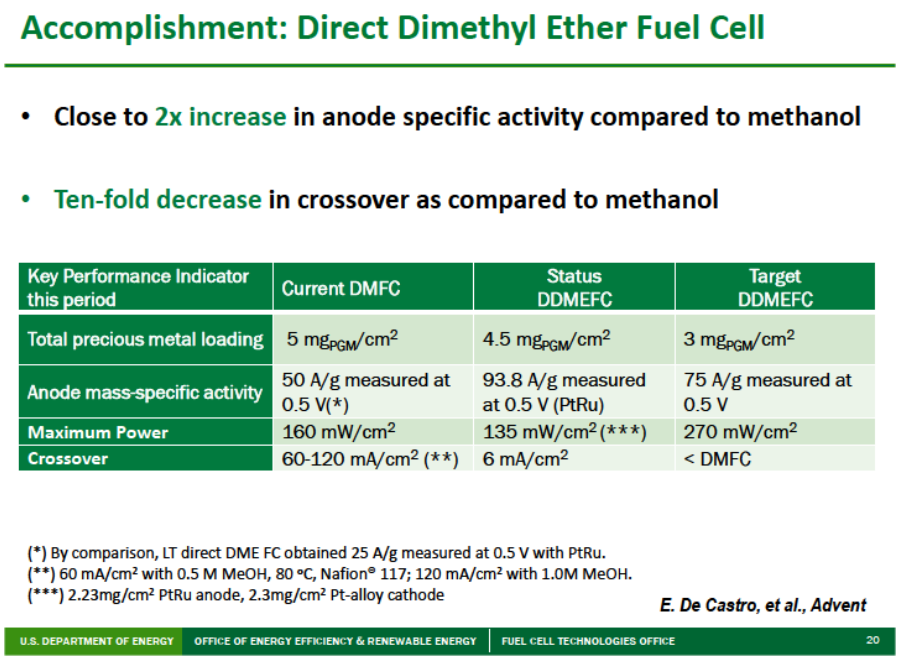
July 3rd, 2018

Direct Dimethyl Ether Fuel Cell Research Presented at Department of Energy Annual Merit Review in Washington, DC

On June 13th, Dr. Emory De Castro, CTO, presented a poster at the Department of Energy Annual Merit Review in Washington DC on the company's recent work on Direct Dimethyl Ether Fuel Cells. This work was done in partnership with Dr. Piotr Zelenay at Los Alamos National Laboratory (Los Alamos, NM). In addition to the poster demonstrating recent advances, the project was selected as one of the Department of Energy's recent notable accomplishments by Dr. Dimitrios Papageorgopoulos (Fuel Cell Technologies Office) during an overview presentation. Dr. Papageorgopoulos highlighted a nearly two-fold increase in anode specific activity as well as a ten-fold decrease in crossover as compared to current direct methanol fuel cells, all while maintaining a similar maximum power density and reducing the total PGM content of the MEA.



Accomplishment: Direct Dimethyl Ether Fuel Cell

- **Close to 2x increase in anode specific activity compared to methanol**
- **Ten-fold decrease in crossover as compared to methanol**

Key Performance Indicator this period	Current DMFC	Status DDMEFC	Target DDMEFC
Total precious metal loading	5 mg_{PGM}/cm^2	4.5 mg_{PGM}/cm^2	3 mg_{PGM}/cm^2
Anode mass-specific activity	50 A/g measured at 0.5 V(*)	93.8 A/g measured at 0.5 V (PtRu)	75 A/g measured at 0.5 V
Maximum Power	160 mW/cm^2	135 mW/cm^2 (***)	270 mW/cm^2
Crossover	60-120 mA/cm^2 (**)	6 mA/cm^2	< DMFC

(*) By comparison, LT direct DME FC obtained 25 A/g measured at 0.5 V with PtRu.
(**) 60 mA/cm^2 with 0.5 M MeOH, 80 °C, Nafion® 117; 120 mA/cm^2 with 1.0M MeOH.
(***) 2.23mg/cm^2 PtRu anode, 2.3mg/cm^2 Pt-alloy cathode

E. De Castro, et al., Advent

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