

STATUS OF OXYGEN REDUCTION CATALYST  
RESEARCH AND DEVELOPMENT

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## OUTLINE

- I. BASICS OF THE OXYGEN REDUCTION REACTION ON Pt IN ACID ELECTROLYTE
- II. KINETICS OF ORR ON SUPPORTED Pt CATALYSTS IN PEM ELECTROLYTE
- III. ALTERNATIVE ELECTROLYTES
- IV. ELECTRODE RESISTANCE POLARIZATION IN FUEL CELL CATHODES
- V. CONCLUSIONS

## REFERENCES

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- IV. **ELECTRODE RESISTANCE POLARIZATION IN FUEL CELL CATHODES**  
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## CONCLUSIONS

- COMMERCIALY AVAILABLE MEA'S ALREADY ACHIEVE NEARLY IDEAL Pt UTILIZATION
- CERTAIN Pt ALLOYS (e.g. PtNi) ALLOW LOWER LOADINGS THAN PURE Pt WITHOUT ANY LOSS IN PERFORMANCE (PERHAPS A FACTOR OF TWO)
- KINETICS OF ORR ON Pt FUNDAMENTALLY THE SAME IN NAFION AND NAFION-LIKE LIQUID ELECTROLYTES (e.g. perfluoroalkyl(di)sulfonic acids)
- LOW CONDUCTIVITY OF NAFION MAKES IT DIFFICULT TO IMPLEMENT NON-METALLIC ELECTROCATALYSTS (e.g. porphyrins)