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2021 WORLD FUEL CELL CONFERENCE

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Invited Keynote Lecture

Presentation Title	**CO- and H_2S-Tolerant Electrocatalysts for Hydrogen Oxidation Reaction in Proton Exchange Membrane Fuel Cells**
Abstract (Approximately 200 words)	Proton Exchange Membrane Fuel Cell (PEMFC) is considered to be a promising energy conversion device due to its high energy/power densities, high efficiency and low/zero emission. Currently, the most practical catalysts for PEMFCs are still Pt-based ones. Nowadays, hydrogen fuel for PEMFCs mainly comes from steam reforming of hydrocarbons, which inevitably contains impurities. Regarding the impurities, CO and H_2S have received particular attention because trace amounts of them in hydrogen fuel can poison the Pt-based catalysts. Extensive researches have been carried out to address the issue of CO poisoning in PEMFCs, and it is found that Pt-based multi-metallic catalysts especially carbon-supported Pt-Ru alloy catalysts can give enhanced resistance to CO-poisoning. The mechanism of CO tolerance at Pt-Ru alloy catalysts have been well studied. However, H_2S poisoning has not been given sufficient attention. As reported, even 0.1 ppm H_2S in hydrogen fuel could lead to decrease in cell potential [2]. Therefore, it is necessary to give more effort to developing H_2S tolerant electrocatalysts for PEMFCs. In our effort, a transition-metal-oxide-supported Pt-Ru alloy electrocatalysts with both high CO- and H_2S-tolerant capabilities for PEMFCs has been developed. Experimental results show that the transition-metal-oxide support can play a vital role in offering Pt-Ru alloy with additional strong resistant ability to H_2S poisoning, suggesting that such a transition-metal-oxide support should be a possible approach to mitigate H_2S poisoning in PEMFCs.
Biographical Sketch (Approximately 200 words)	Dr. Wei Yan is currently an associate professor in the Institute for Sustainable Energy at the Shanghai University. She received her Ph.D. degree in Electrochemistry from Wuhan University in 2005 and carried out her postdoctoral research in Nanjing University from 2005 to 2007. Her research interest is in the area of research and development of advanced electrode materials for electrochemical energy storage and conversion systems, including: 1) electrocatalysts for PEMFCs and Zinc-air batteries; 2) carbon materials for lead-carbon batteries; 3) scaffolds for Li/Na/K metal anodes. Dr. Wei Yan is now working with Prof. Jiujun Zhang on research and development of CO and H_2S-tolerant electrocatalysts for PEMFCs with high efficiency.