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HT-PEMFC electro-catalysts applied in desulfurization

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In hydrogen challenged economy the implementation of a High Temperature Polymer Electrolyte Fuel Cell (HT-PEMFC) directly connected to a reformer is emerging as a promising technology. Several complicated issues of the LT-PEMFC can be avoided by increasing the working temperature up to 200°C. Nevertheless, hydrogen sulfide present in the reformed fuel causes irreversible deactivation of Pt electro-catalyst. For this reason, at Fraunhofer ICT one of our electrochemical research activities is to develop innovative materials that combine high reactivity to the hydrogen oxidation reaction with elevated tolerance to H₂S. In this regard, last year a highly active Pt-based bimetallic electro-catalyst which combines both characteristics was found. An additional advantage of this bimetallic material is that the amount of Pt used is significantly reduced in comparison to commercial catalyst. The higher tolerance to H₂S was determined to be related with its enhanced capability to convert H₂S in to SO₂, detected in the outlet gas by mass spectrometry. This is an interesting aspect to be considered where new desulfurization techniques are being developed. As an extension of the fuel cell application, it was noticed that this type of bimetallic material can be used as a solid electrode to catalyze the oxidation of gaseous H₂S at 145°C. The aim of the current presentation is to introduce the employment of a HT-PEMFC electro-catalyst for electrochemical desulfurization in the petrochemical industry.

Biography

Maria Sol Rau studied Chemistry at the Universidad Nacional del Litoral (Argentina) where she received her PhD in 2011. From 2011 to 2012, she worked as a Post-doc at the Institute of Surface Chemistry and Catalysis from Ulm University (Germany). She is in-charge of the electro-catalysis research activities of the Fuel Cell Group at Fraunhofer ICT. She has published more than 10 papers in reputed journals and has attended several international conferences.

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