

Fe-N-C catalysts for PEM fuel cells - a breakthrough in the development of cheap oxygen reduction catalysts?!

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For an automotive application, the Polymer-Electrolyte-Membrane (PEM) Fuel Cell (FC) is of large interest as it allows reducing the concentration of the green-house gas CO₂. The excessive cost of platinum-based catalysts is one reason hindering the large-scale production of FC-cars.

Therefore, the replacement of platinum by cheap alternative catalyst materials is one major goal. Alternative materials have to reach the target values with respect to (i) turn-over frequency, (ii) site density and (iii) stability. Structural analyses have shown that today's best non-noble metal catalysts exhibit nitrogen-coordinated metal ions (e.g. Fe, Co, Mn, Cu) embedded in a carbon matrix, labelled as Me-N-C catalysts. Especially during the last decade major steps have been made in the development of this type of catalysts. Best results were found for Fe-N-C catalysts.

This talk will give an overview about the most promising Me-N-C catalysts manufactured world wide and comment the advantages and disadvantages of the one or the other preparation strategy. Finally, it will be discussed what aspects remain the major challenges for these catalysts with respect to their application in fuel cells.