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## Electrocatalysis and Catalyst Degradation Challenges in Proton Exchange Membrane Fuel Cells

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### Abstract

After a brief review of the kinetics of the cathodic oxygen reduction and the anodic hydrogen oxidation reaction, a fundamental membrane electrode assembly performance model is outlined, which demonstrates that a 4–10-fold reduced amount of platinum is required for commercially viable large-scale vehicle applications. The various catalyst technology roadmaps to achieve this goal are discussed. With the increasing number of prototype proton exchange membrane fuel cell (PEMFC)-powered vehicles, catalyst durability has also become a strong focus of academic and industrial R&D. Therefore, the key issues of platinum sintering/dissolution under dynamic vehicle operation and of carbon-support corrosion during PEMFC startup/shutdown are reviewed.

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