PEM Fuel Cell Durability for Vehicular Applications: Degradation Modes and Mechanisms

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Durability is one of the most significant technical barriers to the practical applications of PEM fuel cells for vehicular applications; the variations in the load demand of vehicles during operation, or the various driving cycles, significantly reduce the durability of PEM fuel cells. Therefore, understanding the mechanisms of degradation modes for different fuel cell components is of importance to the development of high-performing durable low-cost PEM fuel cells. In this talk, the various modes of fuel cell component degradation (or aging) will be described, and the mechanisms of the degradation modes will be elucidated. The effect of design and operating conditions will be prescribed. Since the component degradation rate depends on the driving cycles of the vehicle, and the differences in road conditions/designs leading to the different "standard" driving cycles in North America, Europe and Japan complicates the design of PEM fuel cells for vehicles destined to the different markets of the world.

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