

Latest Trends and Challenges in Anion Exchange Membrane Fuel Cells

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To date, most research for automotive applications has focused on proton exchange membrane fuel cells (PEMFCs), because these systems have demonstrated the highest power density. Recently, however, an alternative technology, Anion exchange membrane fuel cells (AEMFCs), has gained significant attention, because of the possibility to use stable platinum-group-metal-free catalysts and more inexpensive hydrocarbon-based membranes. Until not long ago, the main barrier in the development of AEMFCs was the availability of highly active non-precious metal catalysts (NPMCs) and conductive anion exchange membranes (AEMs); however, improvements on this front in the past decade show that newly developed NPMCs and AEMs have already reached high levels of activity and conductivity, leading to satisfactory cell performance. In this talk, we discuss the AEM challenges include mechanical stability, high conductivity, improved water transport, and environmentally-friendly, low cost synthesis routes. In addition, we also discuss catalyst development needs for AEMFCs and set catalyst activity targets to achieve performance parity with state-of-the-art automotive PEMFCs.