Special Issue

Advances in Proton Exchange Membrane Technology for Fuel Cells

Message from the Guest Editors

Proton exchange membrane (PEM) fuel cells are key clean energy devices due to their high efficiency, low operating temperatures, and eco-friendly nature. This Special Issue, "Advances in Proton Exchange Membrane Technology for Fuel Cells," highlights recent progress in addressing key challenges related to PEM materials and integration. Research has focused on developing advanced membranes with better proton conductivity, thermal stability, and durability. Promising materials include sulfonated aromatic polymers, inorganic-filled composites, and nanostructured hybrids that perform well under high temperatures and low humidity. Additionally, efforts have been made to improve membrane–electrode interfaces—through ionomer optimization, nanofiber reinforcement, and novel fabrication methods—thus enhancing the efficiency and longevity of systems. Together, these innovations significant advance the development of more reliable, cost-effective fuel cells and support the broader adoption of hydrogen energy. This Special Issue offers a multidisciplinary perspective on the latest developments and future research directions in PEM technology.

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