

### Comparison of Fuel Cell Technologies

Fuel Cell Type	Electrolyte	Operating Temperature	Applications	Advantages
Polymer Electrolyte membrane (PEM)	Solid organic polymer poly-perfluorosulfonic acid	60-100 °C 140-212 °F	Distributed power Portable power Transportation	Solid electrolyte reduces corrosion & management problems  Low temperature  Quick start-up  High power density
Alkaline (AFC)	Aqueous solution of potassium hydroxide soaked in a matrix	90-100 °C 194-212 °F	Space Underwater	Cathode reaction faster in alkaline electrolyte so high performance
Phosphoric Acid (PAFC)	Liquid phosphoric acid soaked in a matrix	175-200 °C 347-392 °F	Distributed power Transportation	Up to 85% efficiency in cogeneration of electricity and heat  Can use fuel gas with carbon monoxide
Molten Carbonate (MCFC)	Liquid solution of lithium, sodium, and/or potassium carbonates, soaked in a matrix	600-1000 °C 1112-1832 °F	Distributed power	High efficiency  Fuel flexibility  Internal reforming  High temperature waste heat
Solid Oxide (SOFC)	Solid zirconium oxide to which a small amount of yttria is added	600-1000 °C 1112-1832 °F	Distributed power	High efficiency  Fuel flexibility/ Internal reforming  High Temperature waste heat  Solid electrolyte reduces corrosion & management problems