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# Polymer Electrolyte Membrane (PEM) Water Electrolysis

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**Abstract**

Water electrolysis represents one of the simplest approaches to produce hydrogen and oxygen in a zero-pollution process by using electricity for the electrochemical decomposition of water. In Polymer Electrolyte Membrane (PEM) electrolysis cells, an acidic ionomer is used as the electrolyte. During the past decade, considerable progress has been made to advance this technology. Today, PEM electrolyzers can be regarded as a well-established industrial technology and are close to broader commercialization. An overview of the technical implementation of PEM water electrolysis is given in this chapter. Efficiency values and a selection of materials will be presented for a single cell and at the stack level. Lifetimes and degradation mechanisms will be considered. Finally, production rates and the power consumption for the system will be discussed.