



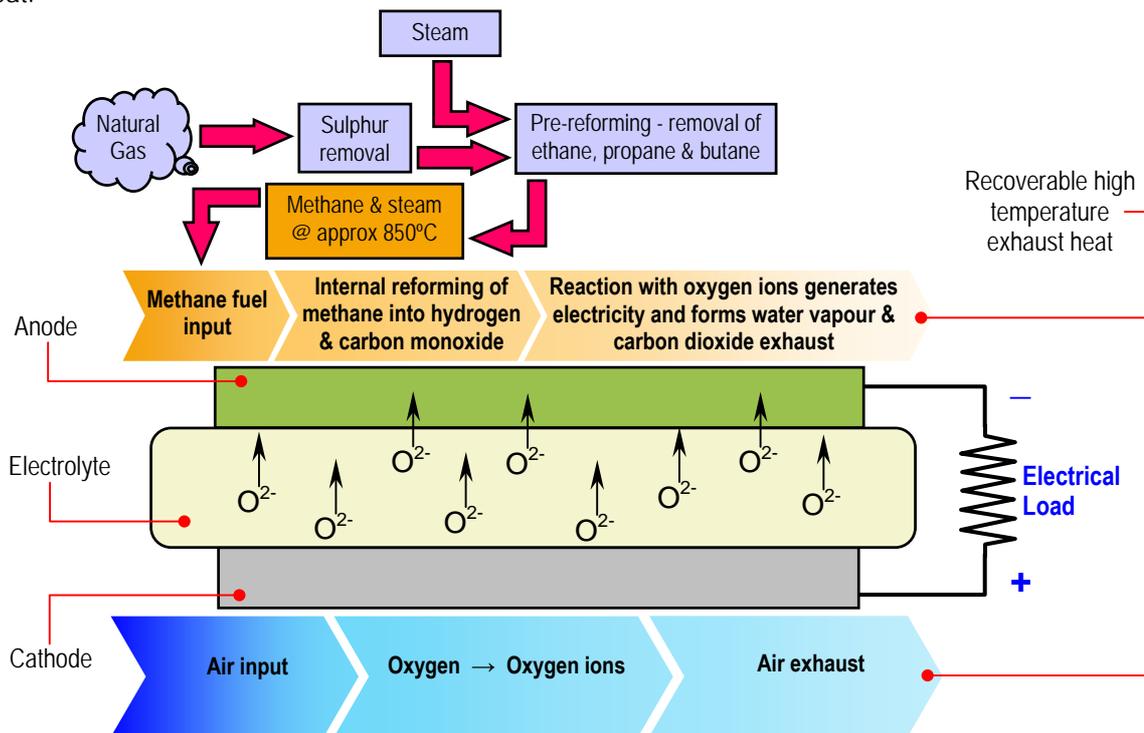
How Does a Fuel Cell Work?

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Fuel cells are at the cutting edge of material sciences and chemistry. Essentially, all fuel cells produce electricity and heat through an electrochemical process using an electrolyte, a cathode and an anode. In the case of Ceramic Fuel Cells Limited (CFCL) products, the electrical energy is produced at high temperatures from the oxygen ions leaving the oxygen-rich cathode, passing through the electrolyte and then joining the hydrogen rich anode side. (see diagram below).

While there are different designs of fuel cells, CFCL manufactures Solid Oxide Fuel Cells (SOFC). These SOFC systems use natural gas as a fuel. (SOFCs can also use other fuels such as LPG and ethanol: unlike other fuel cells SOFCs do not need pure hydrogen) The natural gas is treated to remove sulphur, then combined with steam to remove other gases, leaving a methane-rich gas.

The fuel passes over the anode side which breaks down the methane gas under high temperature, releasing hydrogen. On the cathode side high-temperature oxygen is blown across the cathode. The oxygen ions then travel through the electrolyte membrane and combine with hydrogen on the anode side and create an electric current, water and heat.



When a load (i.e. light globe) is connected between the anode and cathode, the circuit is completed allowing the electrons to flow from the anode back to the cathode and produce electricity, much the same as connecting a light globe to a battery. Most individual fuel cells produce less than one volt of electricity, so they are assembled in layers called 'stacks' to provide a useful voltage. Today, CFCL's fuel cells can silently produce clean, efficient heat and electricity from natural gas.