Solid State Ionic Conductor Development

Poster # Ee .4

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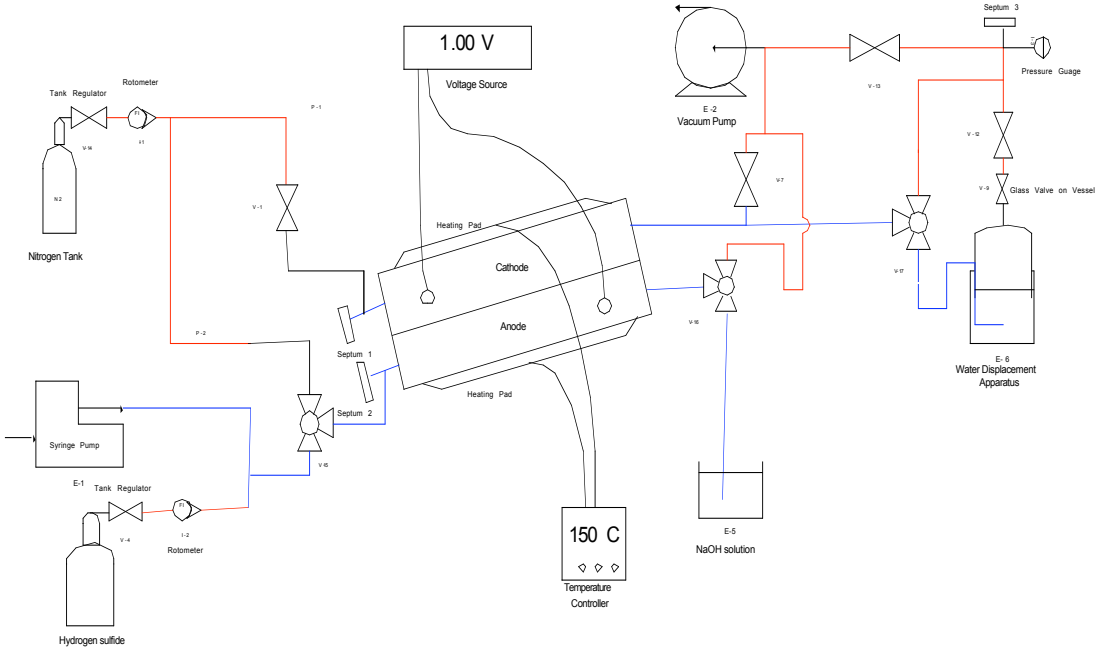
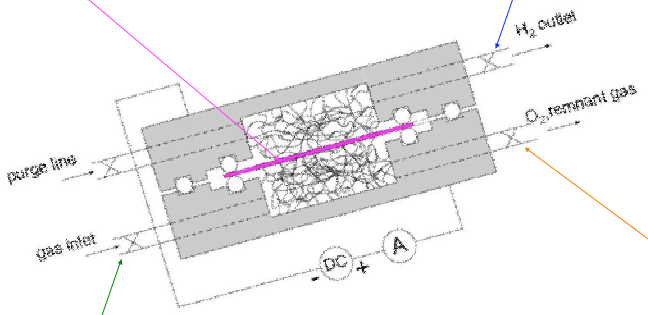
Certain solid state ionic conductors become model electrolyte materials at slightly elevated temperatures. One such material is cesium hydrogen sulfate, which demonstrates a reduction in electrical resistance by four to six orders of magnitude at 150°C. This greatly reduces the voltage potential required to sustain electrolysis.





Hydrogen ions are converted to hydrogen gas in the negative chamber

Hydrogen gas is withdrawn from the negative compartment

Oxygen, remnant feed stock is withdrawn

Steam or another gaseous source of hydrogen reacts with the positive electrode to produce hydrogen ions

One ideal application of this technology is in the coal-fired power industry. Burning coal creates an abundant source of waste heat at or above the required temperatures, and hydrogen sulfide as a by-product. With the solid state ionic conductor the hydrogen sulfide can be electrolyzed into hydrogen and elemental sulfur at a relatively low voltage. The result is the removal of a hazardous material from the waste stream and the production of two valuable byproducts at a fraction of the cost of remediation.

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