



Technology Readiness Level: **4**  
 Component and/or Breadboard Validation  
 in Laboratory Environment

### Electrochemical Synthesis of Propylene Oxide Under Reductive Conditions

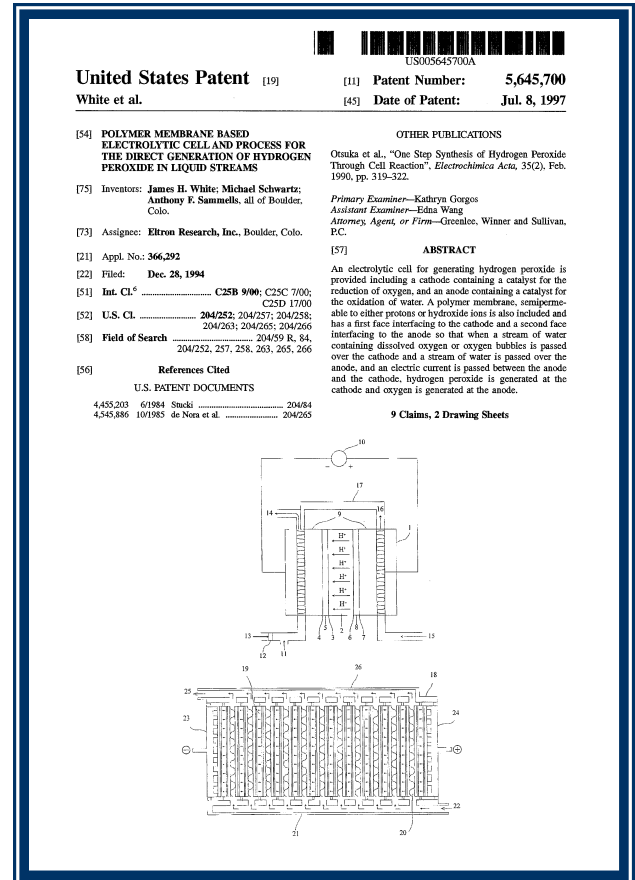
Eltron Research & Development has explored a one-step process for synthesizing propylene oxide from propylene/oxygen mixtures. The technology developed to achieve this employs an electrolytic cell with a bifunctional cathode containing an electrocatalyst for the electrogeneration of hydrogen peroxide and a catalyst for the epoxidation of propylene to propylene oxide.

In Eltron's approach, an electrolytic cell for generating hydrogen peroxide is provided including a cathode containing a catalyst for the reduction of oxygen, and an anode containing a catalyst for the oxidation of water. A polymer membrane, semipermeable to either protons or hydroxide ions, is also included. The membrane has one face interfacing to the cathode and a second face interfacing to the anode; when a stream of water containing dissolved oxygen or oxygen bubbles is passed over the cathode and a stream of water is passed over the anode, and an electric current is passed between the anode and the cathode, hydrogen peroxide is generated at the cathode and oxygen is generated at the anode. The hydrogen peroxide is exposed to a catalyst (titanium silicate) to yield propylene oxide.

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To discuss the possibility of entering into a business relationship with Eltron Research & Development, contact the Business Development Group at [business@eltronresearch.com](mailto:business@eltronresearch.com).



**Eltron's process technology is embodied in United States Patent 5,645,700.**



**Eltron Research & Development Inc.**  
 Eltron Research & Development commercializes novel technologies involving energy, chemicals, advanced materials and environmental systems.