



Materials for a High Temperature PEM Fuel Cell System Housing

AzTE Case #M7-001

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Background

PEM (Proton Exchange Membrane) fuel cells are attractive for use in automobiles. PEM fuel cells use bipolar plates to channel fuel into the reaction area and to direct the electric current. These functions require that bipolar plates be resistant to corrosion and high temperatures as well as electrically conductive. While these plates are traditionally composed of graphite, the thickness of graphite plates makes the fuel cell stack bulky and heavy.

Invention Description

Researchers at Arizona State University have found specific metals to replace graphite in bipolar plates. Metallic bipolar plates have various advantages over graphite plates, such as being thinner and lighter. In addition, structures can be stamped into the plates instead of machined making for easier production. These improvements are necessary for PEM fuel cells to have viable use in automobiles.

Potential Applications

The market for PEM fuel cells has great potential and will grow as more obstacles are overcome. Improvements to the bipolar plates can contribute to the growth of the market by helping to make PEM fuel cells a realistic option for various applications, which include the following:

- **Automobiles**
- **Utility vehicles (e.g. forklifts)**
- **Other specialized applications (e.g. marine and space)**
- **Military applications**

Benefits and Advantages

- **fuel cells will be smaller, lighter**
- **structures stamped into the plates (easier production)**
- **possibly higher efficiency**