**A Brief Description of High Temperature Solid Oxide Fuel Cell’s Operation, Materials, Design, Fabrication Technologies and Performance”**

**Abstract:**

Today’s world needs highly efficient systems that can fulfill the growing demand for energy. One of the promising solutions is the fuel cell. Solid oxide fuel cell (SOFC) is considered by many developed countries as an alternative solution of energy in near future. A lot of efforts have been made during last decade to make it commercial by reducing its cost and increasing its durability. Different materials, designs and fabrication technologies have been developed and tested to make it more cost effective and stable. This article is focused on the advancements made in the field of high temperature SOFC. High temperature SOFC does not need any precious catalyst for its operation, unlike in other types of fuel cell. Different conventional and innovative materials have been discussed along with properties and effects on the performance of SOFC’s components (electrolyte anode, cathode, interconnect and sealing materials). Advancements made in the field of cell and stack design are also explored along with hurdles coming in their fabrication and performance. This article also gives an overview of methods required for the fabrication of different components of SOFC. The flexibility of SOFC in terms fuel has also been discussed. Performance of the SOFC with varying combination of electrolyte, anode, cathode and fuel is also described in this article.

**Keywords:** fuel cell; solid oxide fuel cell; materials; fabrication; performance