A fuel cell is a way of cleanly and efficiently converting the energy of a fuel into electricity. Focusing on “solid oxide fuel cells” (SOFC)—which are expected to attain the highest generation efficiency among fuel cells—we have developed a generation element (i.e., a “cell”) with a unique material and structure and configured the cells as a laminated stack. This configuration has achieved the world’s highest generation efficiency and cell lifetime. Moreover, a generator module that efficiently utilizes exothermic heat generated during power generation for endothermic reactions (such as conservation of stack temperature and preheating) was developed. In generation tests using town gas as a fuel, this generator is demonstrating high generation efficiency.

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**Overview**

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**Features**

- High generation efficiency is achieved by means of a cell and a high-performance stack utilizing an original electrode material
- Long cell lifetime (thanks to the original electrode material with high stability) and low cost (thanks to non-requirement of precious-metal catalysts)
- Exothermic heat generated during power generation is effectively utilized for maintaining stack temperature, reformation reactions*, gas preheating, and so on
- Efficiency can be further boosted by utilizing high-temperature exhaust heat
- CO₂ can be reduced by 10% in comparison with commercial power supplies

**Application scenarios**

- High-efficiency power supply for transmission buildings and offices
- “Cogeneration” supply of heat and electricity for restaurants, convenience stores, etc.

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* Reformation reactions: Heat is needed for a reaction that converts a fuel like town gas into a form suitable for power generation.
- This study includes results obtained through collaboration with Toho Gas Co., Ltd. and Sumitomo Precious Products Co., Ltd.