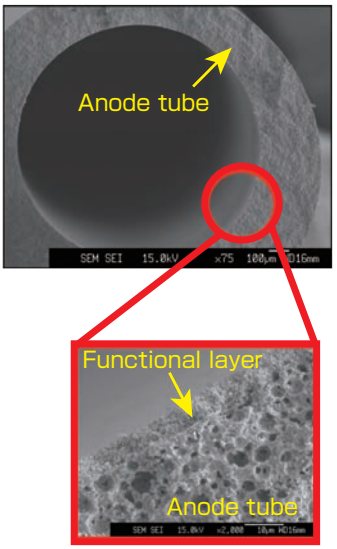
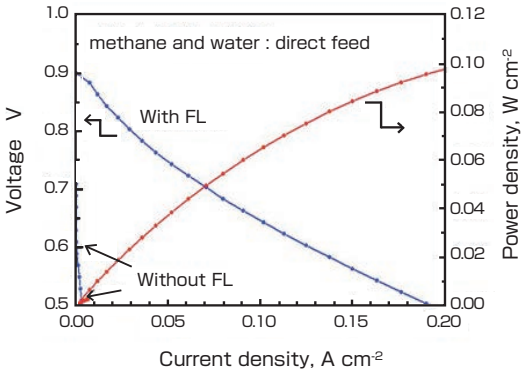
Low temperature operable micro SOFCs

First demonstration of power generation by methane direct reformation at low temperature

We report a new concept of an SOFC utilizing a functional layer on the surface of an anode, for the direct reformation of a hydrocarbon fuel using a micro-tubular design. Preparation of the functional layer is cost-effective and the cell with a pure-ceria (CeO_2) functional layer was successfully fabricated. The cell displays practical cell performance below 500 °C using methane-water mixture as the fuel gas, and shows enhanced performance compared to one without a functional layer.



Cross-sectional SEM image of the micro tubular SOFC with the functional layer



Performance of the micro tubular SOFC with and without the functional layer (FL) at 450 °C using methane–water fuel

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Technology for color imaging in darkness

Successful imaging of color animation of objects in darkness

We have developed a new technique for color imaging of objects in darkness by irradiating infrared light to the objects and by imaging the reflected infrared light from the objects. Along with the surge of recent security consciousness, demand for security cameras such as crime prevention cameras or surveillance cameras rises more and more. However, conventional infrared imaging techniques provide only monochromatic images and have problems in low visibility. Therefore, a higher-performance imaging technique with high visibility is expected. The present technique is based on a highly sensitive infrared imaging technique and a high speed image processing technique. It makes possible to indicate objects in darkness in real time with equivalent or similar color to the color of the objects under visible light, resulting in a promising technique for various applications such as for security cameras, assist cameras for vehicles, etc.

Example of normal color image under fluorescent lamp light (left) and example of color image in darkness taken by the developed system (right)

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