NEWS RELEASE

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SDK Develops Platinum-Substitute PEFC Catalysts with High Efficiency

Showa Denko K.K. (SDK) has developed new platinum-substitute catalysts for polymer electrolyte fuel cells (PEFCs) under the New Energy and Industrial Technology Development Organization's (NEDO) project led by Professor Kenichiro Ota of Yokohama National University.

These new catalysts comprise a niobium-oxide-based catalyst and a titanium-oxide-based catalyst, each containing carbon and nitrogen atoms. They exhibit the world's highest levels of efficiency in terms of open circuit voltage and durability among platinum-substitute catalysts so far announced in the world, as follows:

1. Open circuit voltage (Note 1): 1.00V or more
2. Durability (Note 2): 500 hours or more (The performance test is continuing and the record is being renewed.)
3. Production cost: ¥500/KW or less (Note 3)

Notes:

1. Open circuit voltage refers to the potential difference between anode (along which the hydrogen gas flows) and cathode (along which the oxygen gas flows) at the time of the start of power generation. The higher the difference, the higher the cell's output. In the case of platinum-based catalyst, open circuit voltage is 1.03-1.05V.
2. Durability must exceed 5,000 hours for practical use. However, durability of 100 hours has been the tentative goal for the development of non-precious-metal catalysts.
3. The cost is 1/20 or less when compared with the present cost of platinum-based catalyst.

PEFC catalysts are used at both anode and cathode, encouraging chemical reactions of hydrogen and oxygen. While platinum is now mainly used as catalyst, the metal's high price and low levels of reserves tend to restrict the spread of PEFCs. Furthermore, a platinum-based catalyst used at a point close to cathode has a possibility of melting.

PEFCs generate power through chemical reactions of hydrogen and oxygen, contributing to the reduction of CO2 emissions and enabling the production of compact and light-weight cells. Thus, PEFCs are expected to be widely used as power sources for vehicles, mobile devices and homes.

As the newly developed Nb- and Ti-based catalysts have lower solubility than platinum, they will enable substantial cost reductions and longer life of PEFCs. Based on very-fine-particle manufacturing technologies and high-conductivity carbon materials, SDK will further improve the catalyst performance and establish volume production technologies to encourage the use of the new catalysts in fuel cell electric vehicles (FCEVs), mobile devices and homes.

For further information, contact:
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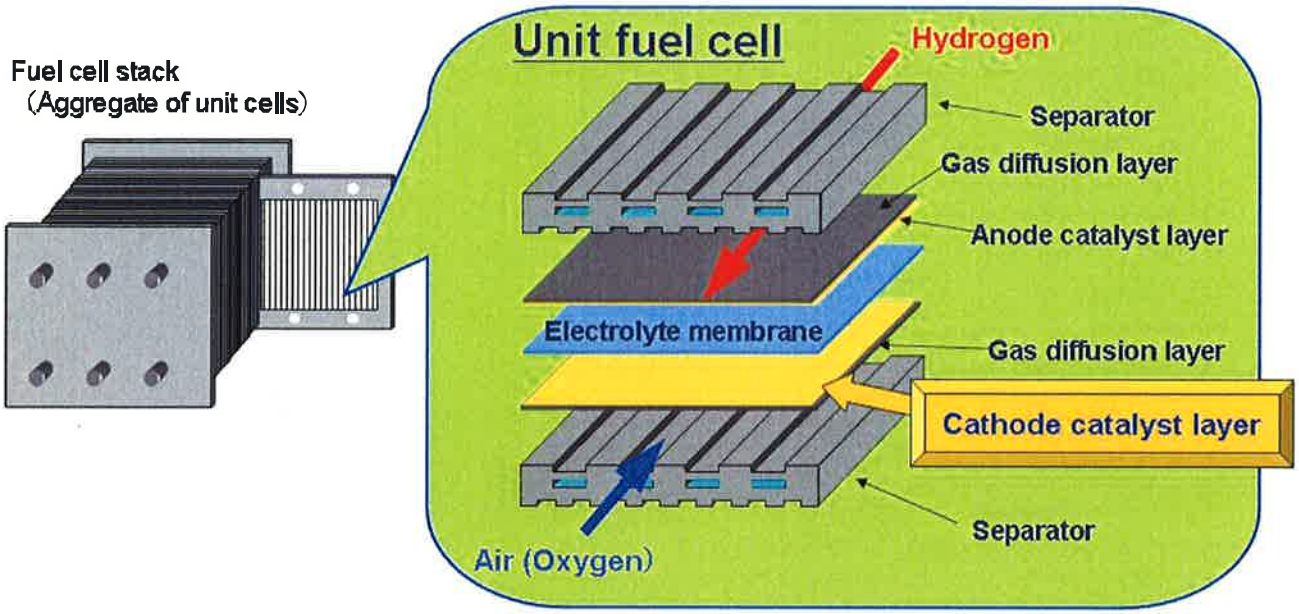
[Reference]
Conceptual drawing of a polymer electrolyte fuel cell



The above drawing is based on NEDO's material and partially revised by SDK.