



**National Research
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**Professor Chang Hyuck Choi's joint research team
improves the catalyst durability of hydrogen fuel cell
with active oxygen control (National Research
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- The introduction of low-cost carbon-based catalysts to hydrogen cars has taken a step towards popularizing eco-friendly hydrogen cars. GIST (President Seung Hyeon Moon) Professor Chang Hyuck Choi and KAIST Professor Hyung-joon Kim have led a joint research team that has identified active oxygen as the cause of the reduction in carbon-based catalyst durability in hydrogen fuel cells.

- A variety of studies have been conducted to replace expensive platinum catalysts with low-cost carbon-based catalysts to ensure the price competitiveness of hydrogen cars. As a result, the performance of the catalyst was comparable to that of the conventional platinum catalyst, but it was not applied to commercialization due to its low durability not exceeding 100 hours.

- The research team found that low durability of carbon-based catalyst is due to active oxygen, which is an intermediate product.
 - Hydrogen peroxide is produced when the hydrogen fuel cell is driven. When hydrogen peroxide is exposed to carbon based catalysts, just as when it is applied to a wound, it bubbles up by the activated oxygen. The researchers found that the catalytic performance was reduced by this active oxygen.
 - Catalytic performance was also restored by removing oxygen functional groups generated by active oxygen in carbon based catalysts. The structure of the catalyst does not collapse and can recover performance by controlling the active oxygen.

- Professor Chang Hyuck Choi said, "This study unravels a mystery of the last few years about the durability of carbon-based catalysts. In the future, we plan to study the successful introduction of carbon-based catalysts for fuel cell vehicles through active oxygen control."

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