

## Cell performance evaluation of direct PEM fuel cell using 'cyclohexane' with zero-CO<sub>2</sub> emission

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In direct PEMFC, methanol has shown good performance, and methanol fuel cell systems have already proved to be feasible for portable applications.

However, oxidation of methanol involves CO<sub>2</sub> emission, and there are still some drawbacks such as the catalyst poisoning by CO, and the high degree of crossover.

Recently, the utilization of cyclic hydrocarbons such as cyclohexane have been proposed. It freely absorb and desorb hydrogen like metal hydrides by catalytic reactions with no by-products. Thus, cyclohexane turns to benzene by electrochemical dehydrogenation and generates electric power in direct PEMFC with no CO, CO<sub>2</sub>. Also the crossover of cyclohexane is significantly small due to the hydrophobicity and the large molecule size of cyclohexane.

In this study, we investigated the cell performance of Direct PEM fuel cell using cyclohexane and examined polarization curves using the various Pt-based alloy catalysts.