

## Experimental Study of the Activity Change Due to Operation History in PEMFC

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Evaluating the accurate activation overpotential with MEA is important to design the Fuel Cell. We developed a new method to measure the precise activity with MEA by keeping the effect of platinum oxides constant and studied the activity changes after various operation histories. Cyclic voltammetry was used to quantitatively correlate the activity changes with the mechanism. As a result, activity decreased after low humidity operation, and recovered after high humidity operation with N<sub>2</sub> atmosphere with the potential below 0.2 V. This activity change was very slow and it took more than 8 hours before the activity reaches plateau. This phenomenon is presumably caused by the adsorption/desorption of the sulfonate group of ionomers onto Pt surface based on the observation that the activity change was characteristic of sulfonate group adsorption and it was dependent on the ionomer structure. Oxygen transport resistance in catalyst layer also changed corresponding to the activity change. Accordingly two possible Pt/ionomer interface models have been supposed to explain the above phenomena.