



The TEM image of Pt-VO(salen)/C heat-treated at 300°C, 400°C and 600°C are shown in the Figure. The size of the particles increased with increasing the heat-treatment temperature. The highest catalytic activity was observed at 400°C treatment, and at this temperature the particle size was about 1 to 3 nm.

After the heat-treatment, 30 mg of the catalyst-supported carbon powder (abbreviated as Pt-VO(salen)/C, etc.) was mixed with 500 mg of 5 % Nafion solution (Aldrich) together with 0.1 cm³ of ethanol, to get an ink of the mixture. This mixture was then transferred to the carbon paper disk (TORAY TPG-H-090, 8 mm diameter). The amount of Pt in the mixed catalyst was 5.4×10^{-4} g(Pt) cm⁻², for the apparent electrode area of the disk. Half side membrane electrode assembly (half-MEA) was prepared by hot-pressing the catalyst loaded carbon paper disk to Nafion 115 membrane at the pressure of 100 kg cm⁻² at 130 °C for 3 minute.