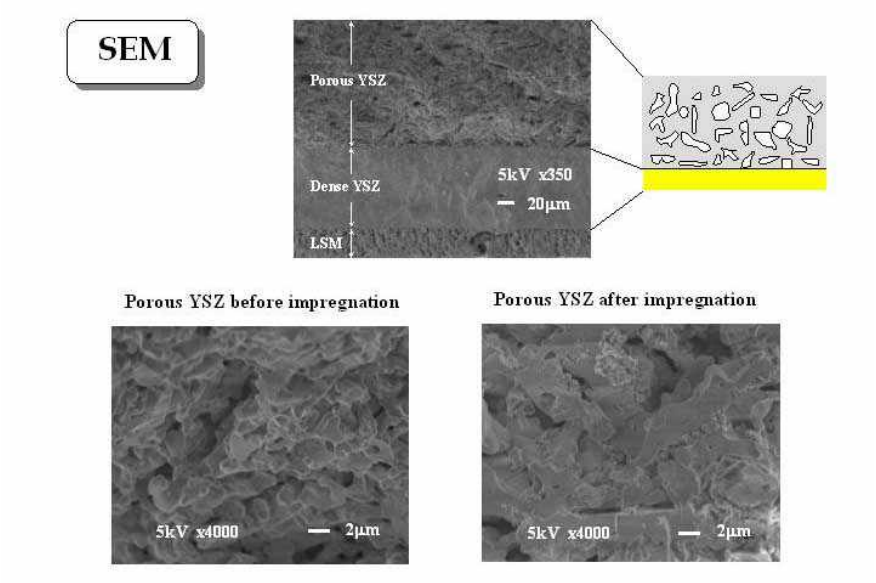
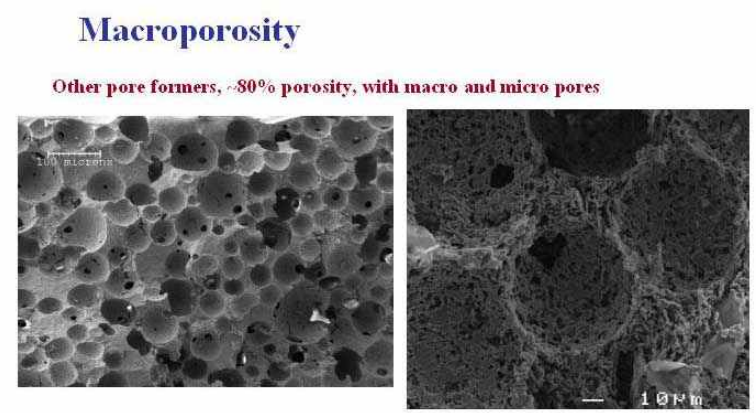
Direct Oxidation Fuel Cells II

현재 본인이 연구를 수행하고 있는 연구실의 고체산화물 연료전지에 대한 내용을 소개하고자 합니다.

◎ Structure

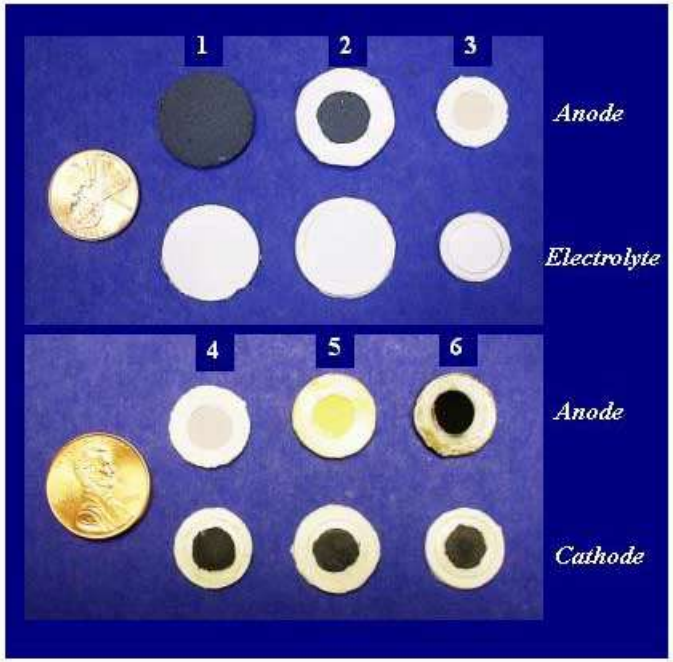




These scanning electron microscope pictures show what the structure of the yttria-stabilized zirconia matrix looked like in some of our early cells, before and after incorporating Cu.

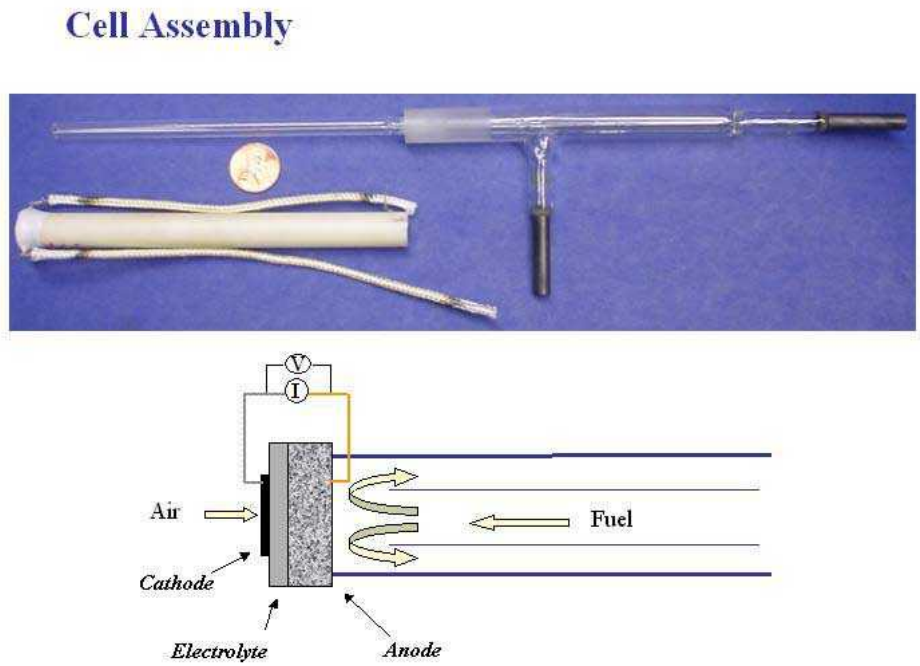
◎ Manufacturing Procedure for single cell

Manufacturing Procedure



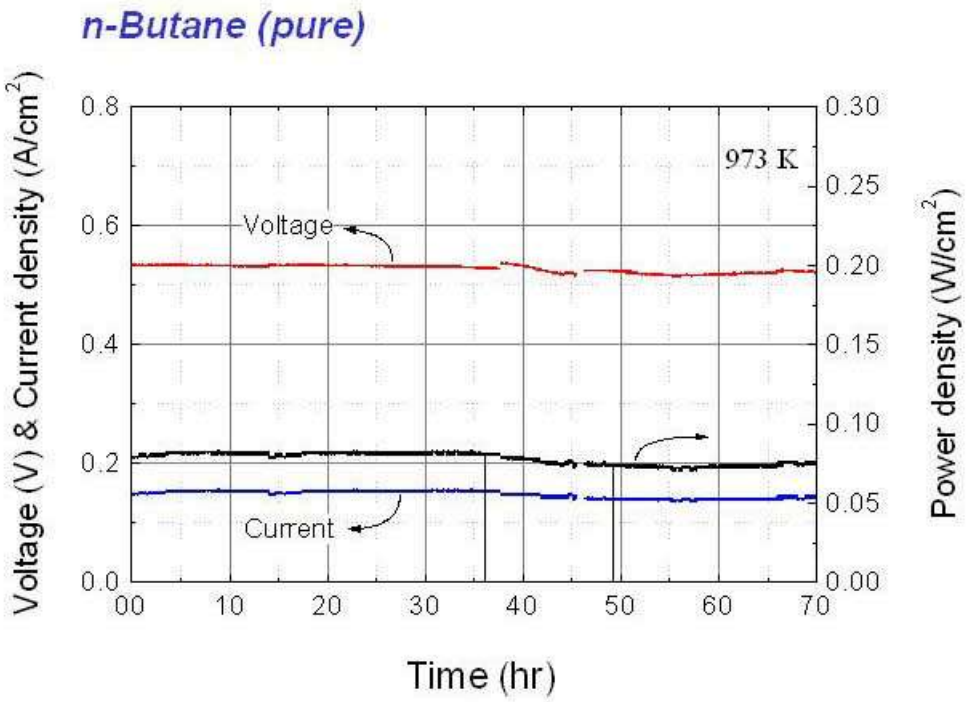
1. Cut discs of 'green' tape
2. Attach YSZ support rings for mechanical strength
3. Sinter to 1550°C
4. Attach 50/50 YSZ/LSM cathode at 1250°C in air
5. Wet impregnate catalyst from aqueous salt solution. Decompose salt at 450°C
6. Wet impregnate Cu from nitrate salt solution and oxidize at 450°C

◎ Cell assembly for single cell



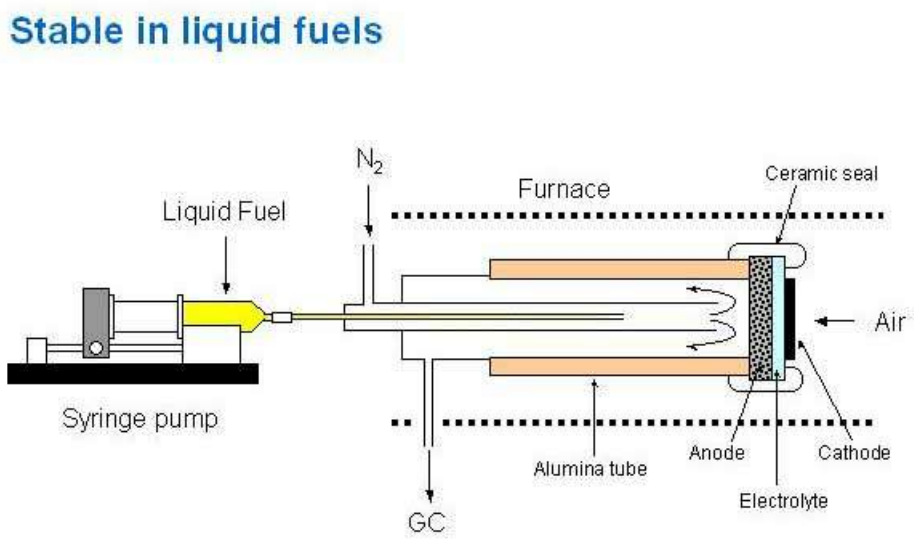
The cell is then glued onto the end of a sapphire tube with a ceramic cement and connected to the fuel lines with the stainless steel connector. In addition to allowing the fuel to be introduced to the anode, this set up allows the products to be sampled using an on-line GC.

◎ Performance for n-Butane using single cell



Here, we show that the Cu-based anode is also stable in pure butane for a period of at least 3 days.

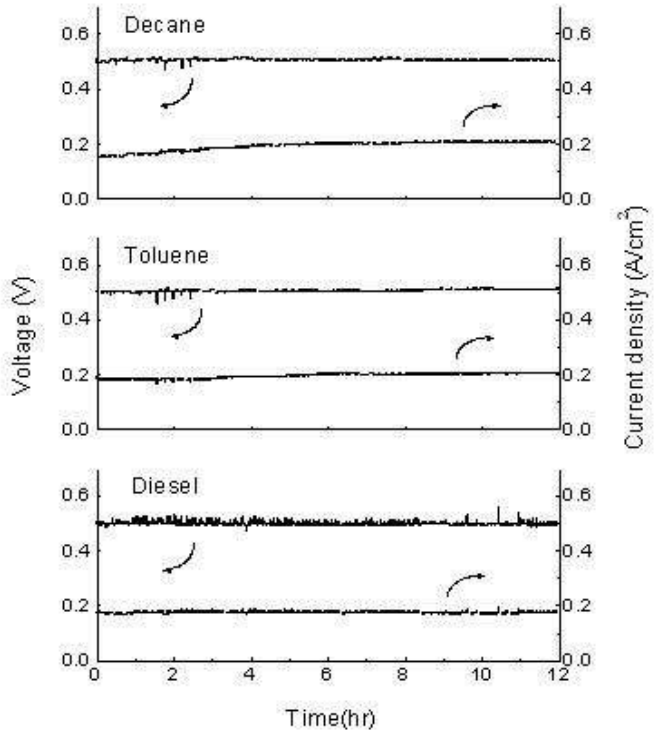
◎ Application for liquid fuel 1



We also injected liquid fuels directly into the cell.

◎ Application for liquid fuel 2

Liquid fuels, (cont.) 700°C



This shows that the cell was stable in these liquid fuels. The "Diesel" was a synthetic fuel produced by Syntroleum.