**Dual tape casting**

1. Doctor blade
2. YSZ slurry
3. Carrier film
4. YSZ and pore former

**Sinter ~1500°C**

**Impregnation**
a) 

b)
Current Density (mA/cm$^2$) vs. Time (min)

- **CeO$_2$/Ni/YSZm**
  - $T=800^\circ$C
  - YSZ=230µm
  - Voltage=0.5V

- **CeO$_2$/Cu/YSZm**

- **H$_2$**
  - Time 0-60 min

- **CH$_4$**
  - Time 60-120 min

- **H$_2$**
  - Time 120-180 min
Calculated from current density assuming
\[ \text{CH}_4 + 4\text{O}^2- \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + 8\text{e}^- \]

Amount of reacted CH\(_4\) molecules (X10\(^{16}\)/s)

Conversion (%)

Ce\(_2\)O\(_2\)/Cu/YSZm
T=800°C, YSZ=130\(\mu\)m

Calculated by gas analysis
Voltage (V) and Current Density (A/cm²) vs. Time (hour)
Anode: Cu / p-YSZ
Electrolyte: YSZ (60 µm)
Cathode: LSM
T = 700°C
Anode: CeO$_2$-Cu / p-YSZ
Electrolyte: YSZ (60 µm)
Cathode: LSM
T=700°C