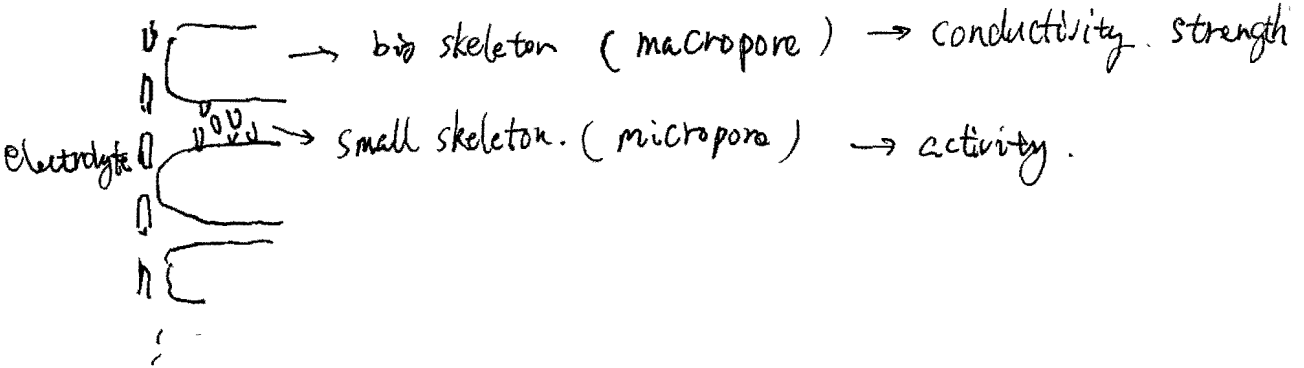


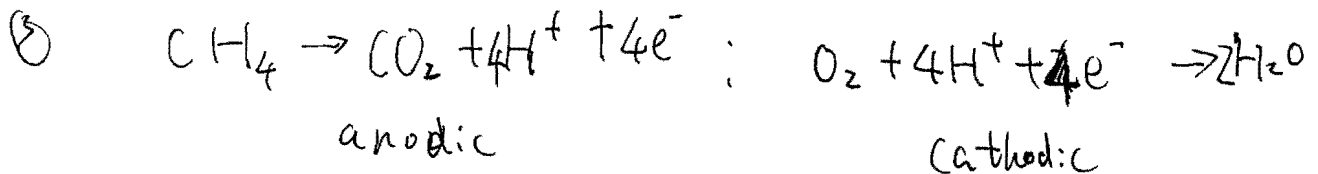
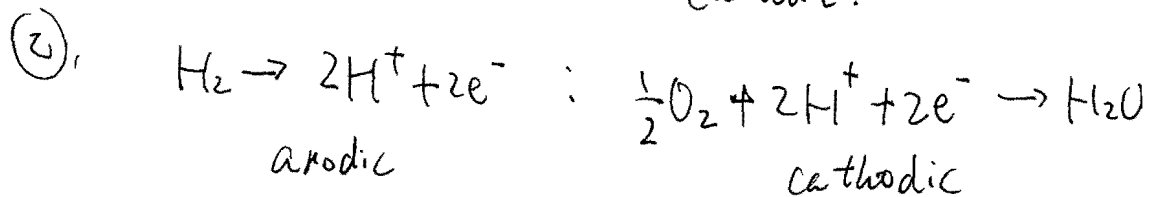
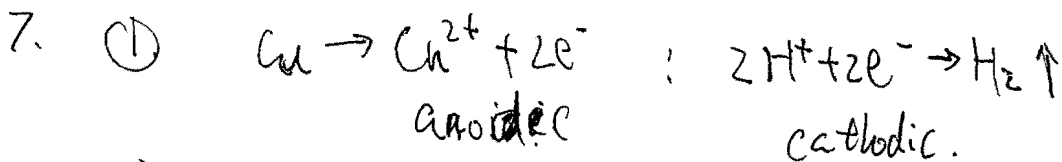
3. Grove's cells have very small OCV, due to small surface area, and non-active Pt. His cell was  $\sim 0.1V$  per cell, in OCV. To electrolyze water on smooth Pt electrode a voltage of  $\sim 2.5V$  is needed. Hence the 26 cells.

4.  $CO_2 + Na_2O \rightarrow Na_2CO_3$  ~ conductive ionic.  
Baur & Preis  $ZrO_2$  based.

5. 

6. PEM  $\sim 80^\circ C$  easy to start, shock-resistant.

SOFC.  $\sim$  start time a few hours and energy intensive.



8.  $460 \times 2 - 432 - \frac{1}{2} \cdot 494 = 241 \text{ kJ/mol} = 241 \text{ kJ/mol}$

9.  $30 \times 5 \text{ kWhr}$  of mechanical energy take  $150/0.4 = 375 \text{ kWhr}$   
 $= 1350 \text{ MJ}$ .

the  $\text{H}_2$  storage is then, 337.5 litre, and 168.75 kg

the Fuel cell part is 30 L and 60 kg. (actually more  
'cause you need more kW to accelerate than cruise.)

Total Volume = 367.5 litre ; Total weight = 228.7 kg.

10.  $\Delta G$  is an extensive quantity, while  $E$  is an intensive one.

also,  $E = \frac{-\Delta G_u}{nF}$  where  $\Delta G_u$  is a per-mole  
free energy.

11. No.