Title:	Theoretical Approach to the Physics of Fuel Cells
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Abstract:	Ion transport rate of PAFC, AFC, PEMFC, DMFC and SOFC fuel cells under the influence of an electric field and concentration gradient were evaluated for static electrolytes. AFC are the best fuel cells for higher current applications while direct methanol fuel cells DMFC are the best for lower current applications at lower temperatures. An equation for voltage output of a general fuel cell was obtained in terms of temperature and partial pressure of reactants. Performance of a 2D fuel cell was analyzed by simulating polarization and power curves for a fuel cell operating at 60oC with a limiting current density of 1.5Acm-2. The maximum power for this fuel cell was 8.4538W delivering 82% of maximum loading current density. When the temperature was increased by one third of its original value, the maximum power increased by 6.75% and at 600C for a 10 times increment of partial pressure of reactants, the maximum power increased by 2.43%.The simulated power curves of the fuel cells were best described by cubic fits.