Figure 4.1 Four PEM fuel cell stacks illustrating developments through the 1990s. The 1989 model on the left has a power density of 100 W L$^{-1}$. The 1996 model on the right has a power density of 1.1 kW L$^{-1}$. (Reproduced by kind permission of Ballard Power Systems.)
Figure 4.7  Simplified and idealised structure of a PEM fuel cell electrode.

A thin layer of electrolyte also reaches the catalyst, promoting the three-phase contact between electrolyte, reactant gas, and electrode catalyst.

Figure 4.8  Enlargement of part of Figure 4.7, showing that the electrolyte reaches out to the catalyst particles.
Figure 4.14  Diagrams to show the principle of humidification using interdigitated flow fields, after Wood et al. (1998).
Figure 4.17  The Ballard Nexa fuel cell is an example of a commercial PEM fuel cell that uses air cooling. The blower for the cooling air can clearly be seen at the bottom left of the unit, and it blows air up through channels in the bipolar plates as per Figure 4.16. The reactant air passes through the humidifier on the front of the unit and is driven by a pump in the box on the top left of the system. (Reproduced by kind permission of Ballard Power Systems.)
Figure 4.18  Examples of different flow field patterns used in PEM fuel cells.