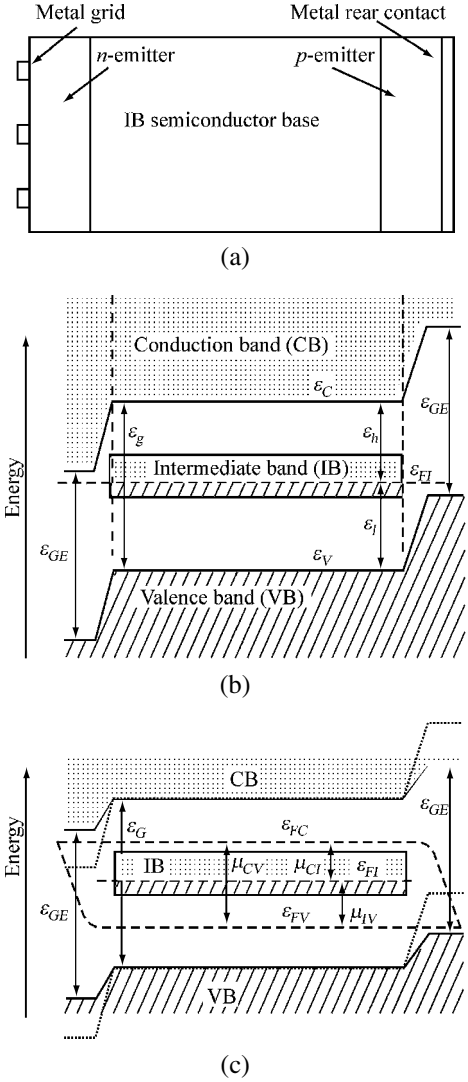

Figure 4.14 (a) Structure of the IB solar cell; (b) band diagram in equilibrium and (c) band diagram of forward bias conditions. (Reproduced from *A Metallic Intermediate Band High Efficiency Solar Cell*, Luque A. and Martí A., by permission of John Wiley & Sons Limited © 2001)

By eliminating μ_{CI} and μ_{IV} from the last three equations, we obtain the current–voltage characteristic of the cell. Efficiencies for different values of ε_l and ε_g are plotted in Figure 4.15.

The maximum efficiency of 63.2% is achieved for a cell of gap 1.95 eV with the IB Fermi level located at 0.71 eV from one of the bands. This efficiency is higher than the one corresponding to two series-connected ideal cells in tandem, of 54.5% (for band gaps of 0.8 and 1.54 eV). A detailed analysis of this cell operation can be found in the References [50–52]. The generalisation of the concept to more than two intermediate