Type I region Type II or IV region

N | N

P | P

P-N junction depletion regions; their widths are different in Type I and Type II/IV regions

Possible depletion region in high/low junction at the Type I / Type III interface

(a)

Type I, II, or IV region Type III region Type I, II, or IV region

N $J_1 \rightarrow$ | N

J_2

P $J_1 \rightarrow$ | P

Depletion region(s) at the interface   P-N junction depletion region(s)

(b)

Figure 8.23 The proposed model of different regions in an n-p junction built on imperfect material. (a) The model of Type I, II, and IV regions, and the relationship among them inside a device. (b) The junction at the interface of Type I, II, IV region, and Type III region. J_1 and J_2 are current flows discussed in Reference [19]. The distribution of carriers inside the Type III region is not considered
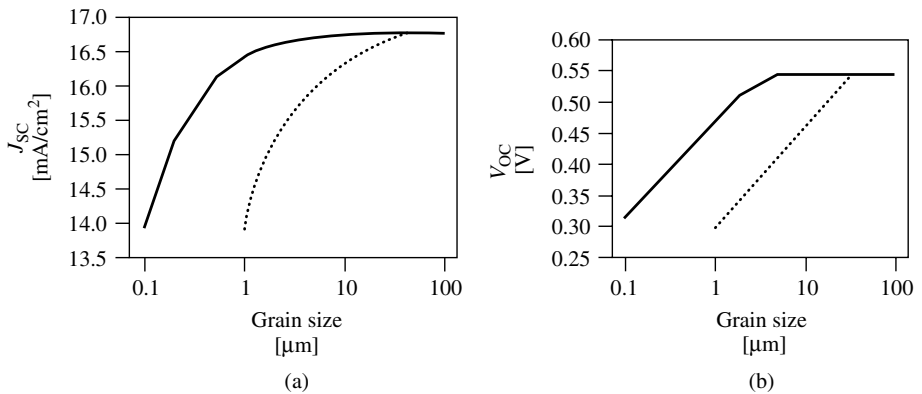
Figure 8.24 Calculated dependence of (a) J_{SC}; and (b) V_{OC} on the grain size of the 10-μm-thick cell for two values of interface recombination velocity, 100 cm/s (solid lines) and 1000 cm/s (dotted lines)