absorption. The amount of the absorption loss depends on the texture parameters, the thickness of the film, and on the metal itself. The approach for minimizing the reflector loss in thin amorphous-silicon solar cells is discussed in several papers [60, 61]. Here we use a similar approach to optimize parameters for the cell structure shown in Figure 8.12.

Figure 8.13(a–d) shows the calculated optical properties of the cells with the basic structures shown in the inserts of these figures. The MACD and metal loss under different conditions are also denoted in these figures. In this calculation, the thickness of the cell considered is 10 μm and the back-contact metal is Al. The texture height is 1.0 micron. From this figure, it can be seen that as long as either surface is textured, the MACD of the device will be higher than that of double-side planar cells, even if metal loss is higher in some cases. Another observation that can be made from these figures is that the MACD will be improved more (about 30%) in double-sided textured or front-side textured/backside planar cells. Double-sided textured cells will yield the highest MACD. This conclusion suggests that double-sided textured or front-side textured structures should be used in the design of solar cells. The important point is that it is more effective to

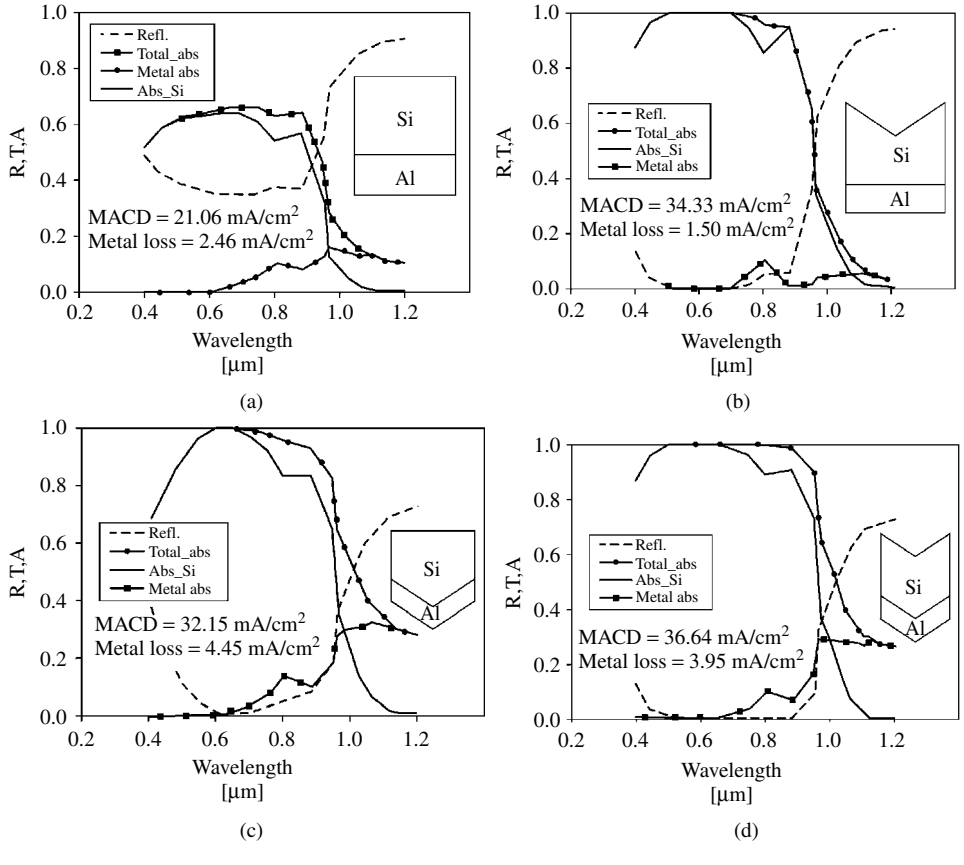

Figure 8.13(a–d) Calculated reflectance (R), transmittance (T), and absorbance (A) of a single-junction cell under different surface configurations. The cell structures are shown in the inset of the figures. Absorber thickness = 10 μm. (a) Planar, (b) FTBP, (c) FPBT, and (d) DT