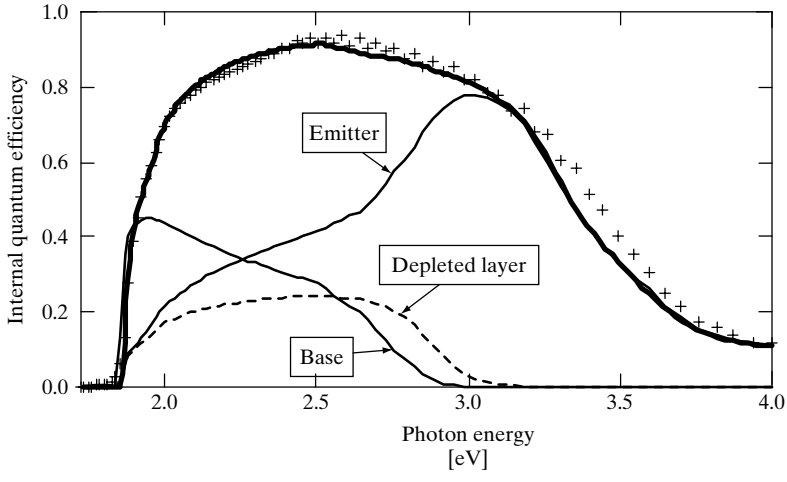

Figure 9.16 Measured (crosses) and modeled (lines) quantum efficiency of a GaInP solar cell. The contributions from the different layers of the solar cell are labeled and demonstrate how the emitter dominates the blue response, whereas the base dominates the red response

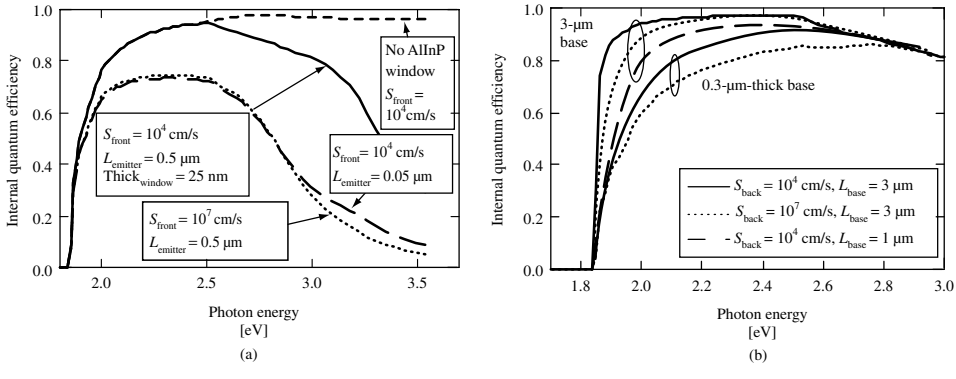

Figure 9.17 Modeled *QE* of GaInP cell. (a) The solid line, relative to the "no AlInP window" line, shows the effect of absorption of 25 nm of AlInP. The two lower curves show the degradation from an increased front-surface recombination velocity (S_{front}) or from a decreased emitter diffusion length (L_{emitter}). (b) Compares a thin and a thick GaInP cell

thick base layer is more sensitive to the diffusion length in the base, whereas a cell with a thin base layer is relatively more sensitive to the quality of the back-surface field (see Figure 9.17(b)).

There are numerous reasons why the V_{OC} or FF may be degraded. Table 9.5 enumerates many of these, and Figure 9.18(a) illustrates one example.

Extra junctions are more likely to be problems when working with Ge because III-V elements dope Ge and Ge dopes the III-V materials. The back of the Ge wafer must be etched before processing to avoid an extra junction at the back [100]. Accidental junctions in Ge are often highly shunted, with nearly ohmic *I-V* characteristics. In this case, these