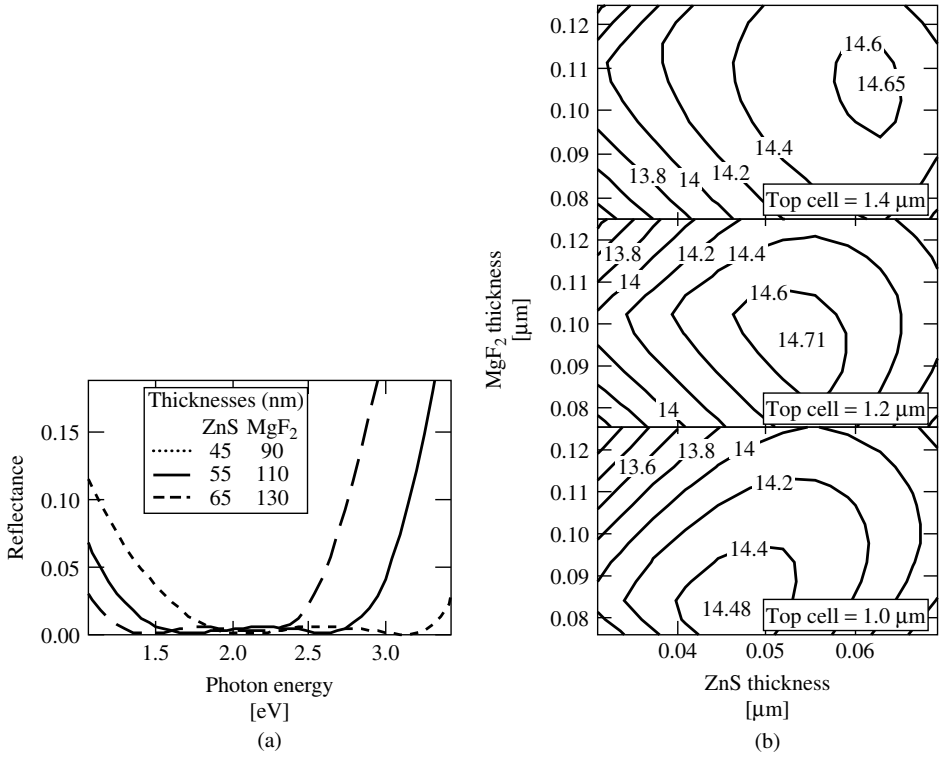

Figure 9.9 (a) Calculated reflectance for a GaInP cell with a MgF_2/ZnS AR coating, for several different combinations of the layer coating thicknesses. (b) Calculated photocurrent (in mA/cm^2) of a GaInP/GaAs two-terminal tandem cell under the AM1.5 direct spectrum as a function of ZnS/MgF_2 AR coating layer thicknesses, for several different top-subcell thicknesses

performance to be expected from these devices. A detailed discussion of general issues in concentrator PV is given in Chapter 11(see also Reference [28]).

9.5.9.1 Spectrum

Cells in a terrestrial concentrator module will be exposed to a spectrum containing significantly less high-energy light than the AM0 spectrum to which multijunction devices are exposed in space applications. This difference calls for the thickness of the terrestrial concentrator top subcell to be greater than that of a space cell, to satisfy current-matching requirements. As noted above, current-matching top-subcell thicknesses for GaInP/GaAs tandem cells are on the order of 0.5 μm for the AM0 spectrum and 1 μm for the AM1.5 direct spectrum. In practice, the situation is not so simple, because the spectrum that a terrestrial cell sees will vary as a function of time, and in most typical operating situations will rarely be as blue-poor as the ASTM (formerly American Soc. for Testing and Materials) standard AM1.5 direct spectrum. The cell design also depends on cell temperature, which will depend on the details of the module (and which, of course, will also vary with time). Further discussion of these issues for multijunction concentrators is given in Reference [29].