Large cell sizes are preferred by the industry, 10×10 cm^2 or 12.5×12.5 cm^2 being standard. Apart from fabricability concerns, a bigger cell means that more current must be collected at the terminals, making Joule losses grow: the longitudinal resistance of the metal lines increases quadratically with their length. This problem, more severe for coarser metallization techniques, decreases efficiency with increasing size. To alleviate series resistance at the price of increased shading, terminals are soldered to metal bus bars inside the cell's active area, thus decreasing the distance from where current must be collected along the fingers.

7.3.6 Cell Optics

Flat plate solar cells in operation are illuminated from a large portion of the sky, not only because of the isotropic components of radiation, but also because of the sun's apparent motion over the day and the year. So, with regard to angular distribution, these cells must accept light from the whole hemisphere. The spectral distribution also varies with time, weather conditions, and so on. For calibration purposes, a standard spectral distribution AM1.5 Global is adopted as a representative condition, usually specified at 0.1 W$\cdot$cm^{-2}.

A solar cell should absorb all useful light. For nonencapsulated cells, the first optical loss is the shading by the metal grid at the illuminated face, if any. This loss can amount to more than 10% for industrial cells while for laboratory cells using fine metallization it is much lower. Though several techniques have been proposed to decrease the effective shading, such as shaped fingers, prismatic covers, or cavities [61], their efficacy depends upon the direction of light and so they are not suited to isotropic illumination.

7.3.6.1 Antireflection coatings

Next, loss comes from the reflectance at the Si interface, more than 30% for bare Si in air due to its high refraction index. A layer of nonabsorbing material with a lower refraction index (n_{ARC}) on top of the Si substrate decreases reflectance: this is a step toward the zero-reflection case of a smoothly varying refraction index. If the layer is thick in terms of the coherence length of the illumination, around 1 μm for sunlight, there are no interference effects inside it. The encapsulation (glass plus lamination) belongs to this category.

Antireflection coating (ARC) means an optically thin dielectric layer designed to suppress reflection by interference effects. Reflection is at a minimum when the layer thickness is (an odd multiple of) $n_{\mathrm{ARC}}\lambda_0/4$, with λ_0 the free space wavelength, since in this case reflected components interfere destructively. At other wavelengths reflection increases, but is always below the value with no ARC or, at most, equal [62]. The ARC is usually designed to present the minimum at around 600 nm, where the flux of photons is a maximum in the solar spectrum. For reflection to become zero at the minimum, the coating index should be the geometric average of those of air and silicon, that is, 2.4 at 600 nm for nonencapsulated cells.

The industry uses TiO_x deposited by chemical vapor deposition (CVD). PECVD SiN_x is very interesting since it also serves as a passivating layer, as explained earlier.

By using double layer coatings with $\lambda/4$ design, with growing indices from air to silicon, the minimum in reflection is broader in wavelength. Evaporated SZn and MgF_2