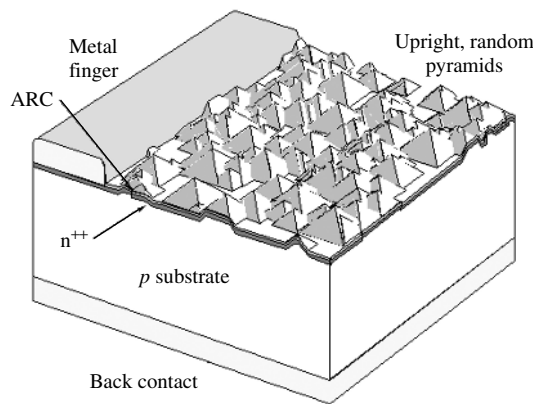


(a)



(b)

Figure 7.2 (a) Passivated emitter and rear locally diffused (PERC) cell; and (b) industrial cell with screen-printed contacts. (Not to scale)

metallic and light (O, C, N) impurities. This translates into the longest post-processing SRH lifetimes in the millisecond range, but still shorter than the Auger limit. Magnetic Czochralski (MCz) material contains much less oxygen than conventional Czochralski and also allows very high efficiencies to be obtained [36].

Industrial cells use Czochralski (Cz-Si) wafers because of their availability. Cz wafers are also perfect crystals but they contain a high concentration of oxygen that affects lifetime in several ways [37]. Some commercial devices are made on multicrystalline (mc-Si) substrates grown in blocks or ribbons with procedures specially developed for photovoltaics. In addition to crystal defects, such as grain boundaries and dislocations, the potential content of metallics is higher because of lower segregation to the melt during the faster solidification process. As a result, the lifetime of mc-Si is lower.