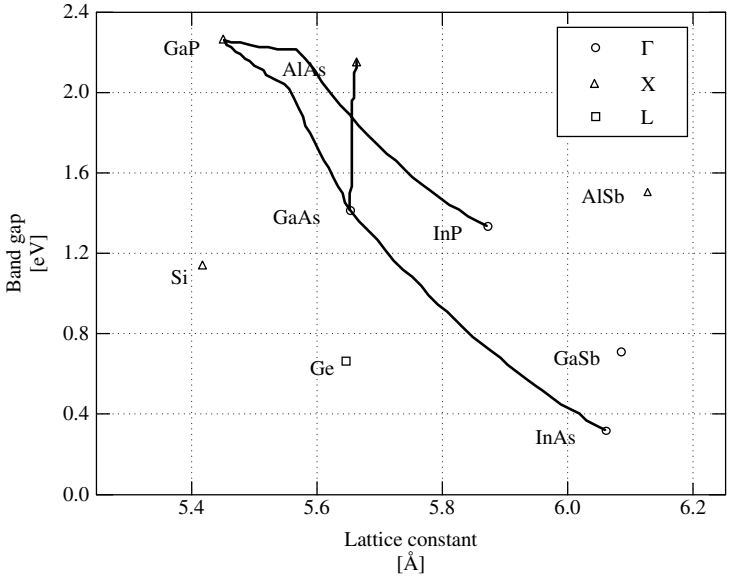

Figure 9.2 Estimated band gap as a function of lattice constant for Si, Ge, III-V binaries and their alloys

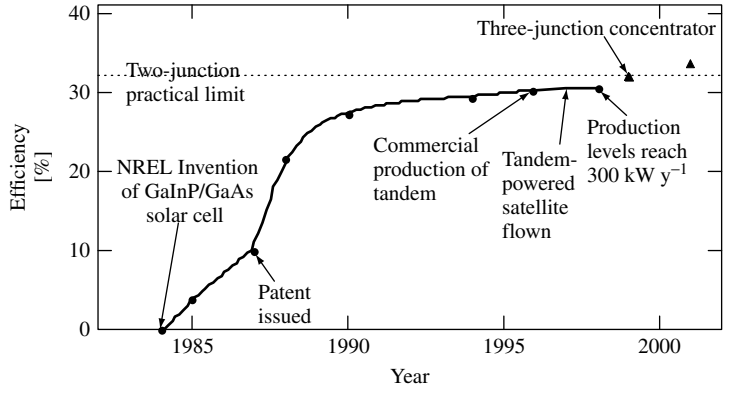

Figure 9.3 These GaInP/GaAs cell efficiencies were measured at one sun with the AM1.5 global spectrum. The triangles were measured under concentrated sunlight for three-junction GaInP/GaAs/Ge cells

than 27% one-sun air mass 1.5 global (AM1.5G) were achieved by changing the top-cell thickness to achieve current matching [6, 7]. This tuning of the top-cell thickness can also be used to achieve current matching under different solar spectra, for example, AM0 and AM1.5direct (AM1.5D). Using this feature of the GaInP/GaAs tandem solar cell, NREL, over the next three years, set records at AM1.5G with an efficiency $\eta = 29.5\%$ [8], at 160-suns AM1.5D with $\eta = 30.2\%$, [9] and at one-sun AM0 with $\eta = 25.7\%$ [10]. Soon, numerous laboratories around the world were studying this device, and the 29.5% record was eventually eclipsed by researchers at the Japan Energy Corporation with an efficiency