

9.8	Future-generation Solar Cells	403
9.8.1	Refinements to the GaInP/GaAs/Ge Cell	403
9.8.2	Mechanical Stacks	404
9.8.3	Growth on Other Substrates	405
9.8.4	Spectrum Splitting	406
9.9	Implementation into Terrestrial Systems	406
9.9.1	Economic Issues	406
9.9.2	Concentrator Systems	406
9.9.3	Terrestrial Spectrum	407
	References	407
10	Space Solar Cells and Arrays	413
	<i>Sheila Bailey and Ryne Raffaele</i>	
10.1	The History of Space Solar Cells	413
10.1.1	Vanguard I to Deep Space I	413
10.2	The Challenge for Space Solar Cells	416
10.2.1	The Space Environment	417
10.2.2	Thermal Environment	420
10.2.3	Solar Cell Calibration and Measurement	424
10.3	Silicon Solar Cells	425
10.4	III-V Solar Cells	426
10.4.1	Thin-film Solar Cells	428
10.5	Space Solar Arrays	431
10.5.1	Body-mounted Arrays	432
10.5.2	Rigid Panel Planar Arrays	432
10.5.3	Flexible Fold-out Arrays	433
10.5.4	Thin-film or Flexible Roll-out Arrays	435
10.5.5	Concentrating Arrays	436
10.5.6	High-temperature/Intensity Arrays	438
10.5.7	Electrostatically Clean Arrays	439
10.5.8	Mars Solar Arrays	440
10.5.9	Power Management and Distribution (PMAD)	441
10.6	Future Cell and Array Possibilities	441
10.6.1	Low Intensity Low Temperature (LILT) Cells	441
10.6.2	Quantum Dot Solar Cells	442
10.6.3	Integrated Power Systems	442
10.6.4	High Specific Power Arrays	443
10.6.5	High-radiation Environment Solar Arrays	443
10.7	Power System Figures of Merit	444
	References	446
11	Photovoltaic Concentrators	449
	<i>Richard M. Swanson</i>	
11.1	Introduction	449
11.1.1	The Concentrator Dilemma	450
11.2	Basic Types of Concentrators	452
11.2.1	Types of Optics	452
11.2.2	Concentration Ratio	455