Nonthermal particle injection and acceleration in supernova shocks are expected to be efficient processes at different evolutionary stages of SNRs. Nonlinear wave-particle interactions being the governing process of the SNR collisionless shock formation are responsible for both shock heating and compression of the thermal gas as well as for the creation of a high energy nonthermal particle population. We discuss the recent models of the particle acceleration (both electrons and nuclei) in supernova shocks in the context of their confrontation with observed multiwavelength spectra of SNRs from the radio to high energy gamma rays. A special attention will be paid to the connections with high resolution SNR spectra currently obtained with XMM-Newton and Chandra. The current status of the cosmic ray origin problem will be discussed.