Here are some review papers dealing with different aspects of trapped ion quantum information processing:

Single-ion quantum physics:

"Experimental issues in coherent quantum state manipulation of trapped atomic ions",
D. J. Wineland et al., J. Res. Natl. Inst. Stand. Technol. **103**, 259-328 (1998).

"Quantum dynamics of single trapped ions",
D. Leibfried, R. Blatt, C. Monroe, D. Wineland, Rev. Mod. Phys. **75**, 281 (2003).

Quantum physics with ion strings:

"Quantum computing with trapped ions",
H. Häffner, C. F. Roos, R. Blatt, Physics Reports **469**, 155-203 (2008)

"Entangled states of trapped atomic ions",
R. Blatt, D. J. Wineland, Nature **453**, 1008-1015 (2008).

"Quantum information processing and metrology with trapped ions",
D. J. Wineland, D. Leibfried, Laser Phys. Lett. **8**, 175-188 (2011).