



Figure 15.3 Molecular structures of typical Ru complex photosensitizers

LiI, NaI, KI, tetraalkylammonium iodide (R_4NI), and imidazolium-derivative iodides with concentrations of 0.1 to 0.5 M (M: molar concentration) and 0.05 to 0.1 M I_2 dissolved in nonprotonic solvents (e.g. acetonitrile, propionitrile, methoxyacetonitrile, propylene carbonate, and their mixture) are employed. Cell performance of DSSCs depends on counter cations of iodides such as Li^+ , Na^+ , K^+ , and R_4N^+ owing to different ion conductivity in the electrolyte or adsorption on the TiO_2 surface, leading to a shift of the conduction-band level of the TiO_2 electrode [24, 25]. Viscosity of solvents directly affects ion conductivity in the electrolyte, and consequently the cell performance. To improve cell performance, low-viscosity solvents are desired. The diffusion coefficient of I_3^- in methoxyacetonitrile is estimated as $5.4\text{--}6.2 \times 10^{-6} \text{ cm}^2 \text{ s}^{-1}$ [24]. Basic compounds such as *tert*-butylpyridine are added to the electrolyte solution to improve cell performance, as shown later [6]. Br^-/Br_2 and hydroquinone have also been used as redox electrolyte for DSSC [25, 26], but the iodine redox electrolyte gives the best performance.