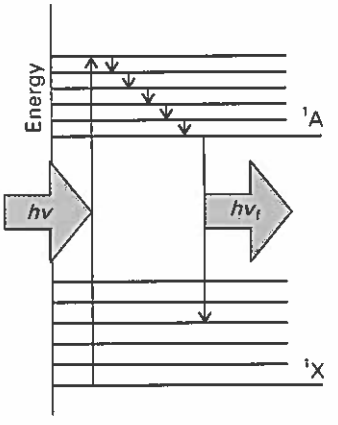

Fig. 11.21 The mechanism of fluorescence. The vibrational relaxation is non-radiative.

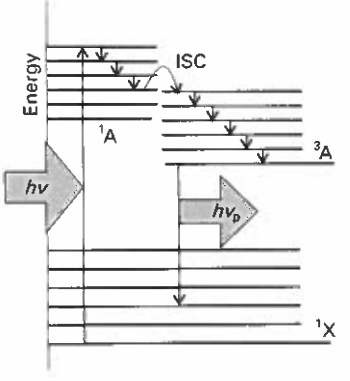

Fig. 11.22 The mechanism of phosphorescence. The vibrational relaxation is non-radiative; ISC stands for intersystem crossing, and is induced by spin–orbit coupling.

phosphorescence. The distincti
made on the basis of the lif
radiation ceased as soon as
phosphorescence it continues f
made on the basis of their m
generated in the course of tran
plicity. In **phosphorescence**, th
that involve changes in spin m

The steps that give rise to flu
absorption is $^1A \leftarrow {}^1X$ (here, A
the ground state). The transi
principle, and so in general a ra
electronic state is populated.
de-excitation, but the solvent
tion energy cannot easily be di
separations. The molecules p
excited singlet, and if their lifet
occur as the molecule generate
in accord with the Franck–C
will show vibrational structur
The fluorescence spectrum will
absorption spectrum, because
discarded into the surroundin
that fluorescence spectra can be
shape of the ground-state mol
variation of the overall intensit
energy transfer between specie

The transitions leading to p
The first step, as in fluorescen
dation within the state ^1A then
coupling in the molecule migh
a radiationless transition invo
triplet state (perhaps arising fr
state), which we shall denote
Franck–Condon principle, at
energy surfaces for the two el
wavefunctions of the two elec
sical terms, at the intersection
This intersystem crossing will
large, and so it is favoured by

If intersystem crossing takes
now the molecule is lowered d
^3A and becomes trapped in th
that the molecule can do. It ca
triplet transitions are forbidde
ficient energy. However, it is n
because the fact that intersy
spin–orbit coupling is strong