The solid state photo-CIDNP effect

Daviso, E.

LIST OF ABBREVIATIONS

ALA	δ-aminolevulinic acid
BChl	Bacteriochlorophyll
Car	Carotenoid
CS	Chemical shift
DD	Differential decay
DDG	Digital delay generator
DFT	Density functional theory
DNP	Dynamic nuclear polarization
DR	Differential relaxation
EPR	Electron paramagnetic resonance
ET	Electron transfer
FWHH	Full width at half height
hfi	Hyperfine interaction
ISC	Intersystem crossing
MAS	Magic-angle spinning
MFE	Magnetic field effect
n.a.	Natural abundance
ns	Nanosecond
NMR	Nuclear magnetic resonance
OPO	Optical parametric oscillator
P	Special pair formed by two Bacteriochlorophyll *a*
P_M	Bacteriochlorophyll *a* of P attached to the M branch of the RC
P_L	Bacteriochlorophyll *a* of P attached to the L branch of the RC
PSI	Photosystem I

PSII	Photosystem II
Photo-CIDEP	Photochemically induced electron polarization
Photo-CIDNP	Photochemically induced nuclear polarization
PFG	Pulse field gradients
Rb.	*Rhodobacter*
RC	Reaction center
rf	Radio-frequency
RFDR	Radio-frequency-driven dipolar recoupling
RPM	Radical pair mechanism
SCRP	Spin-correlated radical pair
TNP	Transient nuclear polarization
TOP	Transiently obscured polarization
TPPM	Two-pulse phase modulation
TSM	Three-spin mixing
WT	Wild type
Φ	Bacteriopheophytin of L branch. First electron acceptor

LIST OF SYMBOLS

a_{iso}	Fermi contact/isotropic hyperfine interaction
A_{zz}	(3,3) element of the hyperfine tensor
A_{zx}, A_{zy}	Pseudosecular elements of the hyperfine interaction
B	Absolute pseudosecular hf interaction
D	Magnitude of the electron-electron dipolar coupling
d	Electron-electron coupling
d'	Electron-electron dipolar coupling

H_{ST_0}	Hamiltonian operator for the S-T_0 intersystem crossing
I	Nuclear spin operator
J	Electron-electron exchange coupling
S	Singlet radical state
S	Electron spin operator
S'	Fictitious electron spin operator
t_{ip}	Time delay between two consecutive ($\pi/2$) pulses
T	Triplet excited state of the donor
T	Time between presaturation and polarization generation
T_R	Recovery time
T_S	Lifetime of the singlet radical state
T_T	Lifetime of the triplet radical state
T_{-1}	Triplet state with magnetic quantum number -1
T_0	Triplet state with magnetic quantum number 0
T_{+1}	Triplet state with magnetic quantum number 1
T_1	Longitudinal nuclear relaxation time
T_2	Transverse nuclear relaxation time
δ	Error of the flip angle of a $\pi/2$ magnetic pulse
ΔA	Hyperfine anisotropy
ΔG^0	Free energy of the donor in the ground state
$\Delta\phi$	Deviation of the relative phase of two consecutive magnetic pulses
$\Delta\Omega$	Difference of the electron Zeeman interaction between the two radicals
λ	Resonance offset
σ_λ	Variance of the resonance offset

σ_S	Initial density matrix for the S-T_0 intersystem crossing
$\tilde{\sigma}_n$	Effective density matrix
τ_B	Time constant describing the photo-CIDNP build up kinetics
ω_I	Nuclear Zeeman interaction
ϕ_n	Phase of the n^{th} magnetic pulse.