

## Abbreviations and Symbols

- A or A<sub>0</sub>, special chlorophyll *a* molecules acting as electron acceptors in type I RCs
- A, antheraxanthin
- A<sub>1</sub>, special phylloquinone molecule(s) acting as electron acceptor in PS I (see also PhQ<sub>A</sub> and PhQ<sub>B</sub>)
- aa or AA, amino acid
- Acc, electron acceptor
- ALA, 5-aminolevulinic acid
- APC, allophycocyanin
- ATP, adenosine triphosphate
- B<sub>A</sub>, B<sub>B</sub>, “accessory” BChls in proteobacterial RCs
- BC, before Christ
- (B)Chl, (bacterio)chlorophyll
- (B)Pheo or (B)Phe, (bacterio)pheophytin
- BIC, butyl isocyanide
- B<sub>X</sub>, B<sub>Y</sub>, higher energy optical absorption bands (Soret bands) of (bacterio)chlorins and porphyrins
- CAB, chlorophyll *a/b* binding protein
- CAC, chlorophyll *a/c* binding protein
- CAM crassulacean acid metabolism
- Car, carotenoid
- CcO, cytochrome *c* oxidase
- CD, circular dichroism
- CM, cytoplasmic or plasma membrane(s)
- CPX, chlorophyll binding protein of molecular mass *X*
- cyt, cytochrome
- d.w., dry weight
- D1, D2, central polypeptides of PS II RCs
- DBMIB, 2,5-dibromo-3-methyl-6- isopropyl-*p*-benzoquinone
- DCCD, dicyclohexylcarbodiimide
- DCMU, 3-(3,4-dichlorophenyl)-1,1-dimethylurea
- DGDG, digalactosyldiacylglycerol
- DOPC, dioleoyl-phosphatidylcholine
- EET, excited state energy transfer (excitation energy transfer)

- ELIP, early light induced protein  
EM, electron microscopy  
 $E_m$ , midpoint oxidation–reduction potential  
ENDOR, electron nuclear double resonance  
EPR, electron paramagnetic resonance  
ER, endoplasmatic reticulum  
ESEEM, electron spin echo envelope modulation  
ESR, electron spin resonance  
ET, electron transfer  
*ETC*, Electron transport chain  
ETP, electron transport phosphorylation  
EXAFS, extended X-ray absorption fine structure  
 $F_A$ ,  $F_B$ ,  $F_X$ , Iron-sulfur centers in PS I and chlorobial RCs  
 $F_{AB}$  protein, subunit PsaC of photosystem I which binds the two iron-sulfur clusters  $F_A$  and  $F_B$   
FCWD, Franck–Condon weighted density of states  
Fd or fd, ferredoxin  
FDP, flavo-diiron proteins  
FIOP, flash-induced oxygen evolution pattern  
Fld, flavodoxin  
FNR, ferredoxin-NADP<sup>+</sup>-oxidoreductase  
FTIR, Fourier-transform infrared  
FWHM, full-width at half-maximum  
Ga, giga years ago  
GAP, glyceraldehyde 3-phosphate  
GAP-DH, glyceraldehyde 3-phosphate dehydrogenase  
 $H_A$ ,  $H_B$ , bacteriopeophytins in proteobacterial RCs  
HiPIP, high-potential iron-sulfur protein  
HLIP, high light-induced protein  
IC, internal conversion  
ICM, intracytoplasmic membrane  
IChM, inner chloroplast membrane  
IEF, isoelectric focusing  
IEP, (pH of) isoelectric point  
IR, infrared  
ISC, intersystem crossing  
isiA, iron stress-induced protein A  
ISP, iron-sulfur protein  
ISP-s, 139 residue *p*-side soluble domain of the ISP  
 $K_Z$ , equilibrium binding (association) constant between Z (or A) and one PS II unit;  
L, lutein  
L, M, H, subunits of proteobacterial RCs  
LD, linear dichroism  
LH, light harvesting

- LHC I, II (or Lhc I, II), light-harvesting chlorophyll complexes of Photosystem I, II
- LH(C)P, light harvesting (chlorophyll) protein
- MDGD, monogalactosyldiacylglycerol
- MgDVP, Mg-2, 4-divinyl phaeoporphyrin methyl ester
- MIMS, membrane inlet mass spectrometry
- MK, MKH<sub>2</sub>, menaquinone, menaquinol
- MSH, membrane spanning helix (see also TMH)
- N, neoxanthin
- NAD<sup>+</sup>, NADH, nicotinamide adenine dinucleotide (oxidized and reduced, respectively)
- NHFe, nonheme iron
- NIR, near-infrared spectral range (700–1200 nm)
- NMR, nuclear magnetic resonance
- NPQ, nonphotochemical quenching (of PS II chlorophyll fluorescence)
- NQNO, 2-*n*-nonyl-4-hydroxyquinoline N-oxide
- OChM, outer chloroplast membrane
- OEC oxygen evolving complex
- p*- and *n*-, electrochemically positive and negative sides of the membrane
- P, special pair, photochemically active pigment of bacterial RCs
- P870, special pair in proteobacterial RCs
- p.m.f.*, proton motive force
- P680 (or P<sub>680</sub>), photochemically active pigment of PS II
- P700, photochemically active pigment (or electron donor) in PS I
- P798, photochemically active pigment in heliobacterial RCs
- P840, photochemically active pigment in chlorobial RCs
- PAR, photosynthetically active radiation
- PBRC (or PbRC), purple bacteria reaction center
- PC, phycocyanin
- PC, also used as abbreviation for plastocyanin
- pcb, prochlorophyte chlorophyll binding protein
- PCET, proton coupled electron transfer
- PE, phycoerythrin
- PEC, phycoerythrocyanin
- PET, photosynthetic electron transport
- PG, Phosphatidylglycerol
- PhQ<sub>A</sub> and PhQ<sub>B</sub>, the two phylloquinones A- of PS I associated to the A- and B-branches of electron transfer
- PQ, plastoquinone
- (P)Chlide, (Proto)Chlorophyllide
- Proto, protoporphyrin IX
- PS I (or PS1), Photosystem I (1)
- PS II (or PS2), Photosystem II (2)
- PS II CC, PS II core complex
- PsaA, PsaB, subunits of PS I RCs
- PsbS (also called CP22), 22 kDa PS II protein

- PscA, PscB, polypeptides of chlorobial RCs  
Q<sub>A</sub>, primary quinone electron acceptor of type II RCs  
Q<sub>B</sub>, secondary plastoquinone acceptor of type II RCs  
Q<sub>x</sub>, Q<sub>y</sub>, low energy optical absorption bands of (bacterio)chlorins and porphyrins  
RC, reaction centre  
RET, respiratory electron transport  
RIXS, resonant inelastic x-ray scattering  
ROS reactive oxygen species  
rRNA ribosomal ribose nucleic acid  
S (or S<sub>i</sub>) states, formal oxidation states of the water-oxidizing complex  
SDS-PAGE, sodium dodecyl sulfate polyacrylamide gel electrophoresis  
SQDG, sulfoquinovosyldiacylglycerol  
TA, transient absorption  
TDS, tridecyl-stigmatellin  
TMH, trans-membrane helix (see also MSH)  
TRO, terminal respiratory oxidase  
T-S, triplet minus singlet  
UQ, ubiquinone (coenzyme Q)  
UV, ultraviolet spectral range (200–400 nm)  
V, violaxanthin  
VDE, violaxanthin de-epoxidase  
Vis, Visible spectral range (400–700 nm)  
W<sub>f</sub>, W<sub>s</sub>, fast and slowly exchanging substrate (water) molecules bound to the WOC  
WOC, water-oxidizing complex (= OEC, oxygen-evolving complex)  
WT, wild type  
XANES, X-ray absorption near edge structure  
Xanth, xanthophyll  
XRD(C), X-ray diffraction (crystallography)  
Y<sub>Z</sub>, Y<sub>D</sub>, redox active tyrosine of polypeptides D1 and D2, respectively, in PS II  
Z, zeaxanthin  
ΔpH, trans-membrane difference of pH  
Δ $\tilde{\mu}_H^+$ , trans-membrane proton electrochemical potential difference  
ε, molar extinction coefficient (M<sup>-1</sup> cm<sup>-1</sup>)  
λ, wavelength (nm)  
μE, micro Einstein (Einstein is the unit for one mole photons)