Artificial metallo-proteins for photocatalytic water splitting: stability and activity in artificial photosynthesis

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Stability and activity in artificial photosynthesis

Laura Opdam

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LIST OF ABBREVIATIONS

ArM	Artificial metalloenzyme
BCA kit	Bicinchoninic acid kit
bpy	bipyridine
CB5	Cytochrome b_5
CD	Circular dichroism
Co1	CoSalen where H_2Salen = N,N'-bis(salicylidene)ethylenediamine
Co2	CoPhthalocyanine
Co3	[Co(II)(2,2':6',2'':6'',2'''-quaterpyridine)$(Cl)_2$]
Co4	[Co(II)(2,2':6',2'':6'',2'''-quaterpyridine)$(H_2O)_2$] $(ClO_4)_2$
CP43	Chlorophyll containing protein 43
CP47	Chlorophyll containing protein 47
Cyt b_6f	Cytochrome b_6f
DLS	Dynamic light scattering
EECC	E = one-electron reduction, C = chemical protonation
E. coli	*Escherichia coli*
EDTA	Ethylenediaminetetraacetic acid
E_m	Midpoint potential
EPR	Electron paramagnetic resonance
ER	Electron relay
ESI-MS	Electrospray ionization mass spectrometry
ET	Electron transfer
FNR	Ferredoxin
HasAp	Haem acquisition system A *Pseudomonas aeruginosa*
HE	Dihydrogen evolution
HEC	Dihydrogen evolution catalyst
HR-MS	High-resolution mass spectrometry
I2M	Interaction of two metal species
IC	Internal conversion
ICP-MS	Inductively coupled plasma mass spectrometry
IPTG	Isopropyl β-D-1-thiogalactopyranoside
ISC	Intersystem crossing
LC-MS	Liquid chromatography mass spectrometry
LED	Light emitting diode
LHC	Light-Harvesting complex
LHCSR	Light-Harvesting Complex Stress-Related

LSW HSQC	Large spectral window heteronuclear single quantum coherence
Mb	Myoglobin
MC	Metal centred
MLCT	Metal to ligand charge transfer
MV	Methyl viologen
MWCO	Molecular weight cut-off
NanoDSF	Nano differential scanning fluorimetry
NaPi	Sodium phosphate
NMR	Nuclear magnetic resonance
NPQ	Non-photochemical quenching
Pheo	Pheophytin
PMSF	Phenylmethylsulphonyl fluoride
PPIX	Protoporphyrin IX
PQ	Plastoquinone
PS	Photosensitizer
Psb	Photosystem II subunit
PSI	Photosystem I
PSII	Photosystem II
qE	Energy quenching
rHSA	recombinant Human Serum Albumin
ROS	Reactive oxygen species
Ru1	[2,2′:6′,2″-terpyridine]-6,6″-dicarboxylate
Ru2	Ru(1,2-bis(pyridine-2-carboxamido)-4,5-dimethylbenzene(2-)(CO)(OH_2)
Ru3	[Ru(II)(2,2':6',2'':6'',2'''-quaterpyridine)($Cl)_2$]
RuPS	[Ru($bpy)_2$(1-(1,10-phenanthrolin-5-yl)-1H-pyrrole-2,5-dione)]$^{2+}$
SA	Sacrificial acceptor
SD	Sacrificial donor
sDev	Standard deviation
SR	Sacrificial reagent
SDS-PAGE	Sodium dodecyl sulphate polyacrylamide gel electrophoresis
SEC-MALS	Size exclusion chromatography multi-angle light scattering
SN	Semi-native
TCEP	Tris(2-carboxyethyl)phosphine
TEOA	Triethanolamine
T_i	Infliction temperature
TOF	Turn over frequency
TON	Turn over number

WHOPS	WholePlasmid synthesis
WNA	Water nucleophilic attack
WO	Water oxidation
WOC	Water oxidation catalyst
WT	Wild type