hxl108	5’-ATTGTTGACGTTCCACCAGGGTTA-3’
hxl109	5’-TGAAAATCTCGCCAAGCTTGTCAAGCCAGGCTAATTGATAGAGTAA-3’
hxl110	5’-TTACTCTATCAATTAGCCTGGCTTGACAAGCTTGGCGAGATTTTCA-3’
hxl111	5’-CAAATAGGGGCAGGACGGGAATTCAGGCGTAGCAACCAGGCGTTTA-3’
hxl112	5’-TAAACGCCTGGTTGCTACGCCTGAATTCCCGTCCTGCCCCTATTTG-3’
hxl113	5’-CCCCGTCTTTCGCTTCCTGGTCATT-3’
hxl114	5’-ACTAATTGTCATGCAGGGTTCTCC-3’
hxl115	5’-CTGAAAATCTCGCCAAGCTTGTCACTAACATGGGGGTTGTGGGAAATT-3’
hxl116	5’-AATTTCCCACAACCCCCATGTTAGTGACAAGCTTGGCGAGATTTTCAG-3’
hxl117	5’-GCCAGATAATTCGACTTAAACTTTCAGGCGTAGCAACCAGGCGTTTAA-3’
hxl118	5’-TTAAACGCCTGGTTGCTACGCCTGAAAGTTTAAGTCGAATTATCTGGC-3’
hxl119	5’-GAGCAAAACCTACTGTCACAACCAT-3’

Table S1 Primer Details Used in Construction and isolation of Mutants

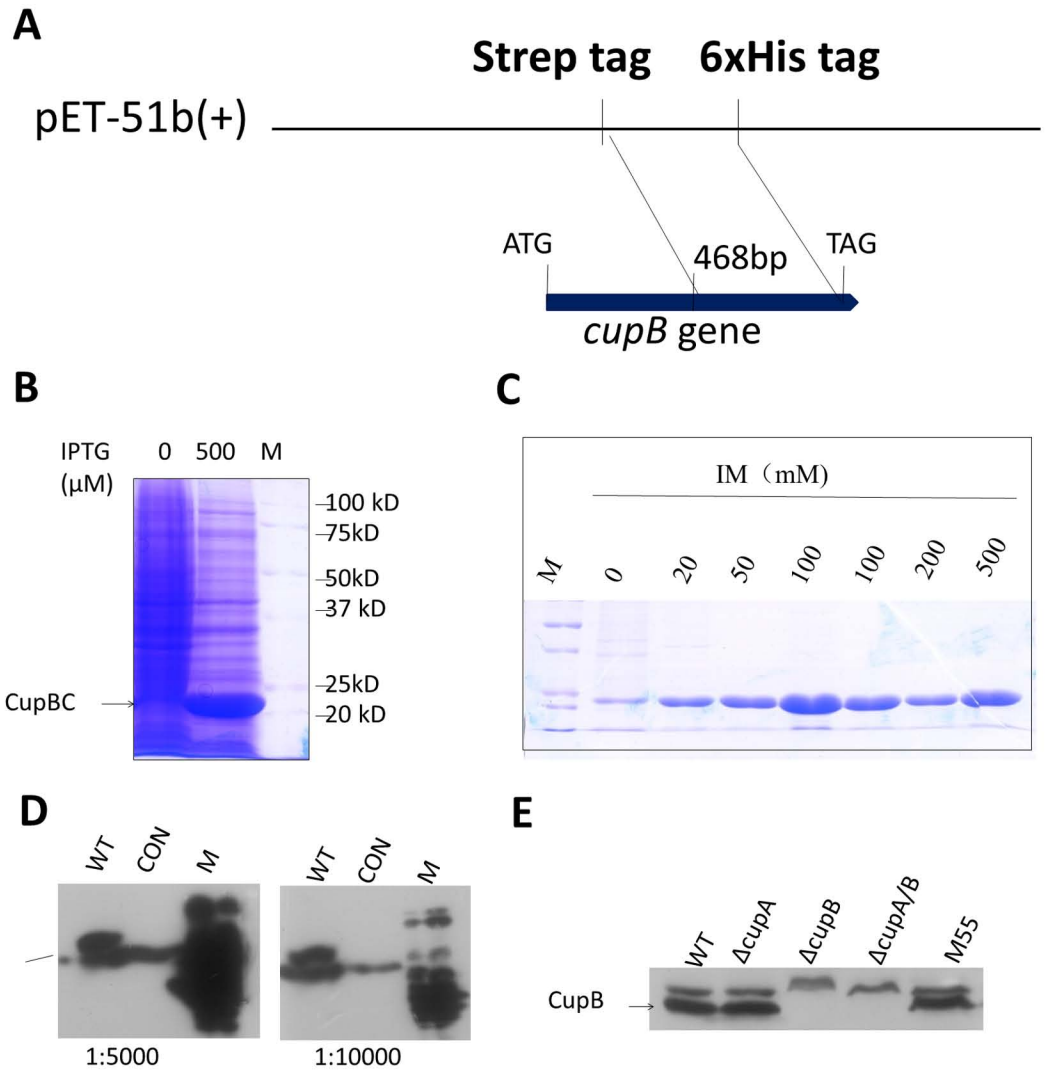
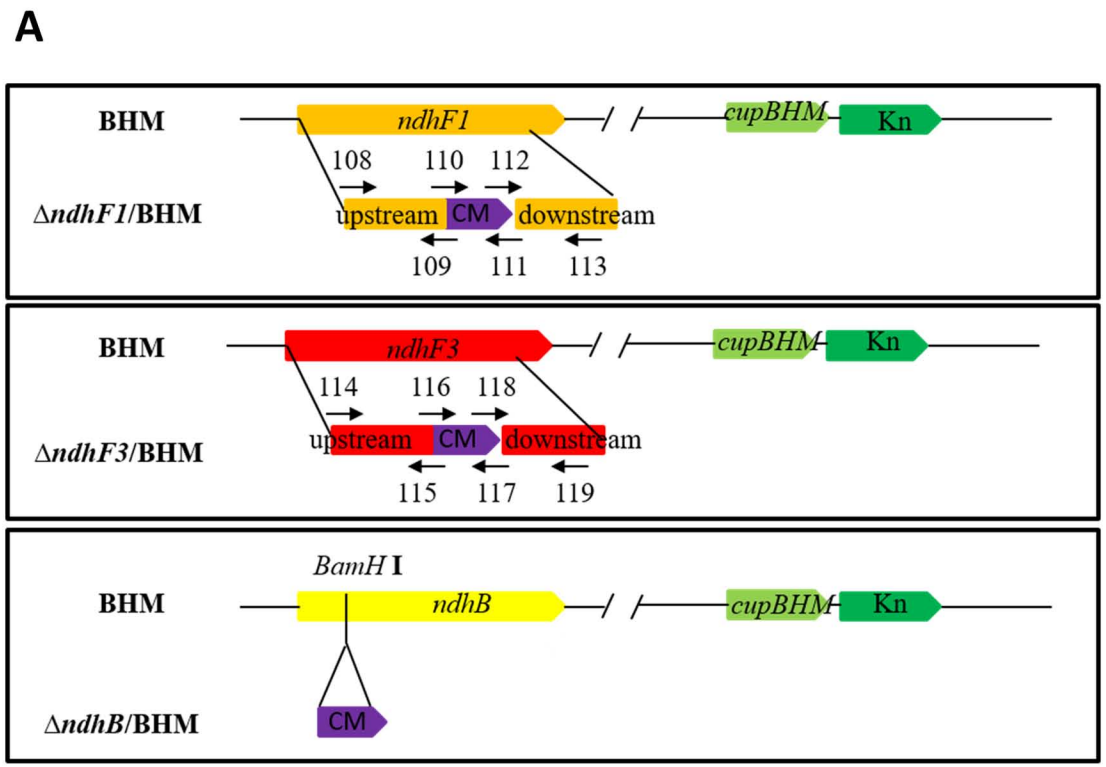
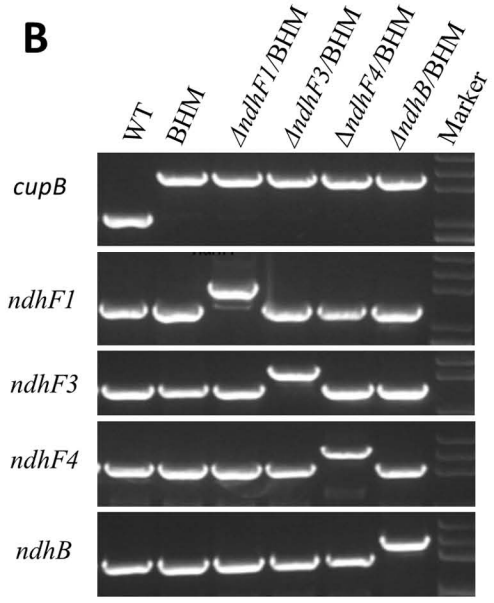


FIG.S1 Polyclonal antibody of CupB preparation and immunological characterization of CupB in mutants.

A. Construction of expression vector of CupB C-terminal (CupBC). B. expression analysis of CupB C-terminal. CupBC: CupB C-terminal , M: protein marker. C. purification of CupB C-terminal with Ni^{2+}-NTA-agarose resin. IM: imidazole. D. immunological characterization of CupB. CON: CupB-His-Myc. M: protein marker. E. immunological characterization of CupB in different mutants.





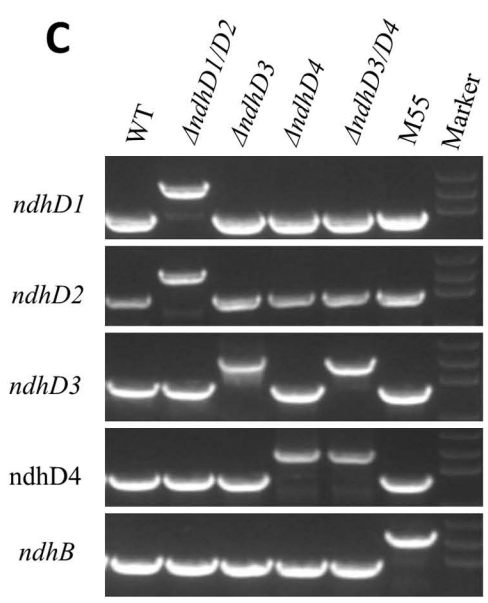
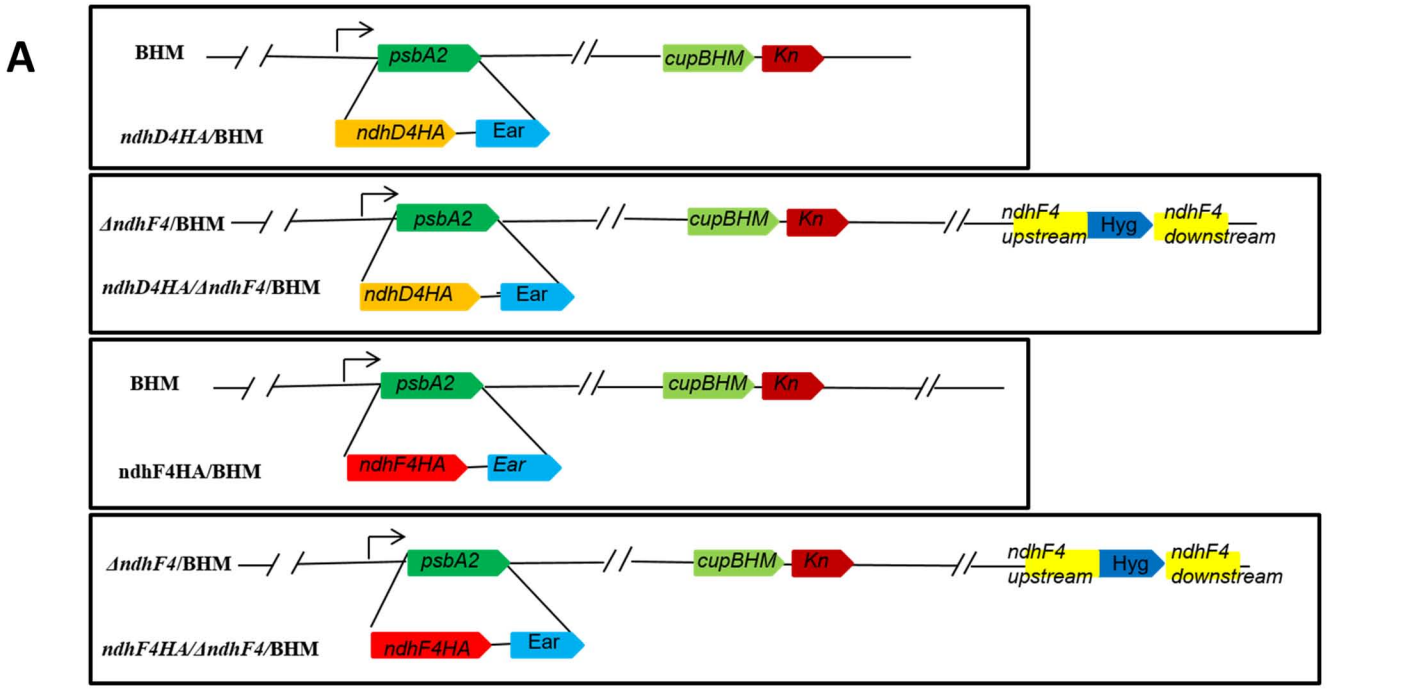
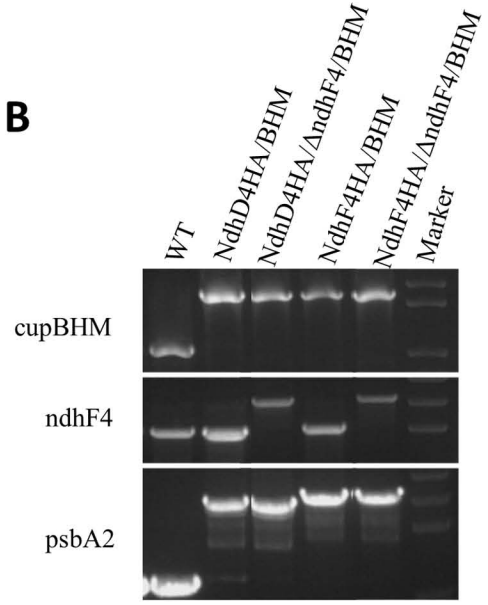


FIG.S2 Construction and segregation of ndhF and ndhD mutants.

A. chloramphenicol resistance cassette was inserted into *ndhF1*, *ndhF3* and *ndhB, separately.* *cupBHM*: CupB tagged with 6xHis-cMyc at the C-terminal. CM: chloramphenicol resistance cassette. Kn: Kanamycin resistance cassette. 108-119: hxl108-hxl119, see supplemental data table 1. **B.** The mutated genes in the transformants of ndhB and ndhF mutants were segregated to homogeneity as determined by PCR amplification. **C.** The mutated genes in the transformants of M55 and ndhDs were segregated to homogeneity as determined by PCR amplification.


A
BHM
psbA2
cupBHM
Kn
ndhD4HA/BHM
ndhD4HA
Ear
ΔndhF4/BHM
ndhF4 upstream
Hyg
ndhF4 downstream
ndhD4HA/ΔndhF4/BHM
ndhF4HA/BHM
ndhF4HA
ΔndhF4/BHM
ndhF4HA/ΔndhF4/BHM


B
WT
NdhD4HA/BHM
NdhD4HA/ΔndhF4/BHM
NdhF4HA/BHM
NdhF4HA/ΔndhF4/BHM
Marker
cupBHM
ndhF4
psbA2

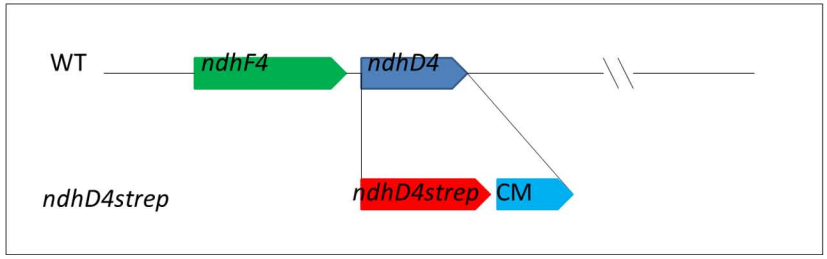

C
WT
ndhF4
ndhD4
ndhD4strep
ndhD4strep
CM

FIG.S3 construction and segregation check of *ndhD4HA*/BHM, *ndhD4HA*/Δ*ndhF4*/BHM, *ndhF4HA*/BHM, and *ndhF4HA*/Δ*ndhF4*/BHM, and *ndhD4strep*.

A. *ndhD4HA*/BHM, *ndhD4HA*/Δ*ndhF4*/BHM, *ndhF4HA*/BHM, and *ndhF4HA*/Δ*ndhF4*/BHM were constructed as shown in **FIG.S3A**. PS II A2 gene was exchanged by *ndhD4* and *ndhF4* tagged with HA gene. **B**. The mutated genes in the transformants of *ndhD4HA*/BHM, *ndhD4HA*/Δ*ndhF4*/BHM, *ndhF4HA*/BHM, and *ndhF4HA*/Δ*ndhF4*/BHM mutants were segregated to homogeneity as determined by PCR amplification. **C**. *ndhD4strep* was constructed as shown in **FIG.S3C**. *ndhD4* gene was exchanged by *ndhD4* tagged with strep gene.

psbA2: photosystem II A2 gene.

cupBHM: CupB tagged with 6xHis-cMyc at the C-terminal.

CM: Chloramphenicol resistance cassette.

Kn: Kanamycin resistance cassette.

Ear: Erythromycin resistance cassette.

Hyg: Hygromycin resistance cassette.

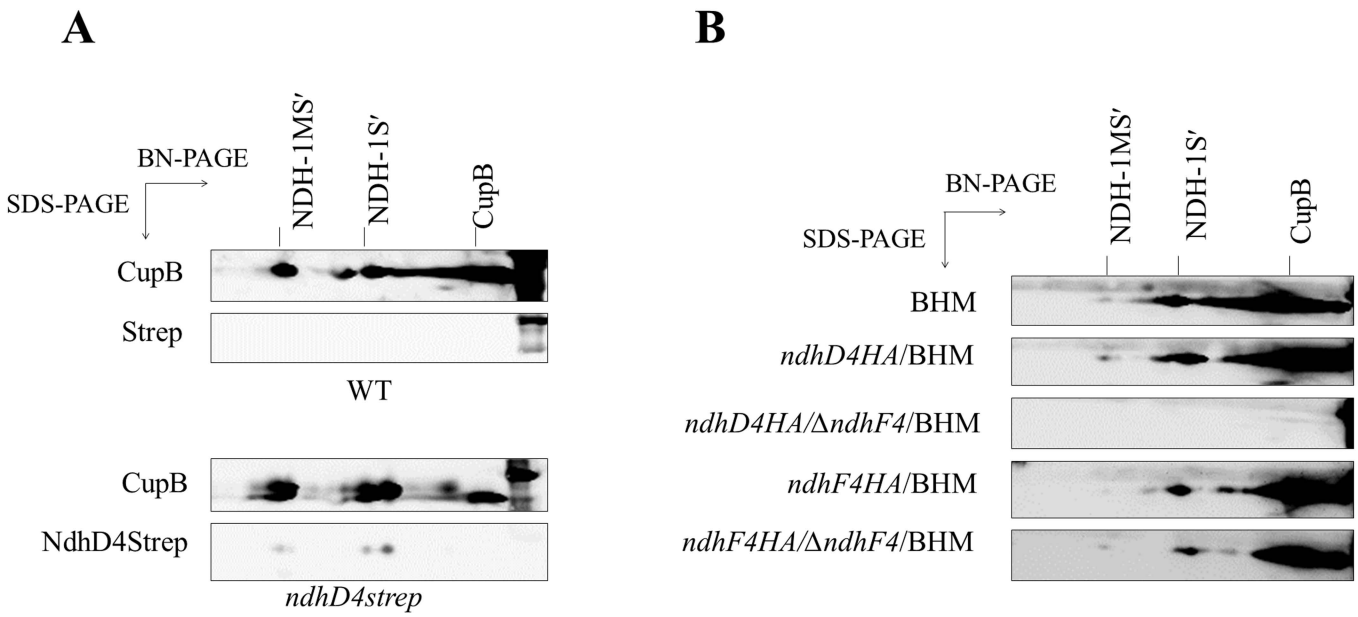


FIG. S4. Association of CupB with NdhD4 and NdhF4.
(A) The position of CupB and NdhD4 were detected by specific antibody. Total membrane proteins from wild type and *ndhD4strep* were separated and immunodetected with antibody against CupB and Strep, respectively. (B) Assembly of CupB complex in transformed mutants background. Membrane proteins from BHM, *ndhD4HA*/BHM, *ndhD4HA*/Δ*ndhF4*/BHM, *ndhF4HA*/BHM, and *ndhF4HA*/Δ*ndhF4*/BHM were separated by BN-SDS-PAGE, and were immunodetected with antibody against CupB.