SUPPLEMENTARY INFORMATION

Microbial approach to low-cost production of photovoltaic nanomaterials

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Supporting information includes 6 supplementary figures in 6 pages

Figure S1. XRD patterns of CIGS incubated (a) with X513 using various stoichiometries of precursor metal solution, Cu(InxGa1-x) and (b) with various bacteria at the same precursor metal solution of CuIn0.4Ga0.6.

Figure S2. Time course experiment to synthesize microbially mediated CIGS via discrete pulsed dosing (dose of the first Cu-In-Ga precursor metal solution at t=0 after at selenite dosing). [selenite, selenide, pH, Eh of the culture medium and numbers of cells].

Figure S3. a, Dual parallel reactors with 24 L medium capacity producing more than 15 g/month; b, XRD patterns of CIGSe incubated with X513 and precursor metal solution of Cu0.55In0.4Ga0.6 exhibiting a good reproducibility.

Figure S4. XRD patterns of (a) CIGSe incubated with X513 using various stoichiometries of precursor metal solution, Cu(InxGa1-x) and (b) poor Cu precursor metal solution of Cu3(In0.4Ga0.6), where 0.5<x<0.95.

Figure S5. XRD patterns of time course experiment for elemental Se (Se0) using selenite (a) and for CIGSe using selenite and precursor metal solution of Cu0.55In0.4Ga0.6 (b) incubated with X513. Selenite dosing is t=0 for elemental Se0 and the first precursor metal dosing is the t=0 for CIGSe.

Figure S6. XRD patterns of comparative study for a, 24 hour delayed metal dosing (top) and final product of abiotic metal dosing to amorphous Se0 (bottom).
Figure S1. XRD patterns of CIGS incubated (a) with X513 using various stoichiometries of precursor metal solution, Cu(In$_x$Ga$_{1-x}$) and (b) with various bacteria at the same precursor metal solution of CuIn$_{0.4}$Ga$_{0.6}$. 
**Figure S2.** Time course experiment to synthesize microbially mediated CIGS via discrete pulsed dosing (dose of the first Cu-In-Ga precursor metal solution at $t=0$ after at selenite dosing). [selenite, selenide, pH, Eh of the culture medium and numbers of cells].
**Figure S3.**

**a.** Dual parallel reactors with 24 L medium capacity producing more than 15 g/month;  
**b.** XRD patterns of CIGSe incubated with X513 and precursor metal solution of Cu$_{0.55}$In$_{0.4}$Ga$_{0.6}$ exhibiting a good reproducibility.
Figure S4. XRD patterns of (a) CIGSe incubated with X513 using various stoichiometries of precursor metal solution, Cu(In$_{x}$Ga$_{1-x}$) and (b) poor Cu precursor metal solution of Cu$_{x}$(In$_{0.4}$Ga$_{0.6}$), where 0.5$<x<0.95$. 
Figure S5. XRD patterns of time course experiment for elemental Se (Se⁰) using selenite (a) and for CIGSe using selenite and precursor metal solution of Cu_{0.55}In_{0.4}Ga_{0.6} (b) incubated with X513. Selenite dosing is t=0 for elemental Se⁰ and the first precursor metal dosing is the t=0 for CIGSe.
Figure S6. XRD patterns of comparative study for a, 24 hour delayed metal dosing (top) and final product of abiotic metal dosing to amorphous Se^0 (bottom).