

Supplementary data

Table S1 Flask culture medium composition

Component	Concentration (mg/L)
NaNO ₃	60
NaHCO ₃	500
KH ₂ PO ₄	1000
NaH ₂ PO ₄ ·2H ₂ O	1500
Na ₂ HPO ₄	600
MgCl ₂ ·6H ₂ O	250
CaCl ₂ ·2H ₂ O	8.0
FeCl ₂ ·4H ₂ O	1.0
ZnCl ₂	0.070
H ₃ BO ₃	0.006
CuSO ₄	0.003
Na ₂ MoO ₄ ·2H ₂ O	0.004
MnCl ₂ ·4H ₂ O	0.100
CoCl ₂ ·6H ₂ O	0.190
NiCl ₂ ·6H ₂ O	0.036

Table S2 Inoculated sludge composition

Component	Concentration (g/L)
Total solid (TS)	2.84 ± 0.21
Volatile solid (VS)	2.23 ± 0.23
Total suspended solid (TSS)	2.68 ± 0.18
Volatile suspended solid (VSS)	2.13 ± 0.32

Notes: pH, 6.5 ± 0.3

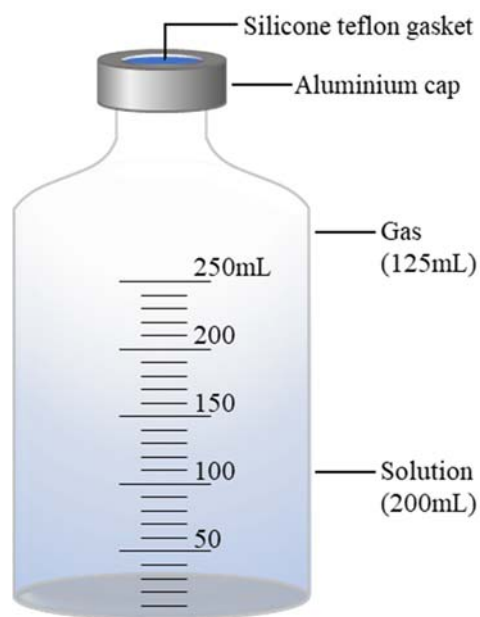


Fig. S1 The schematic diagram of a crimp top vial

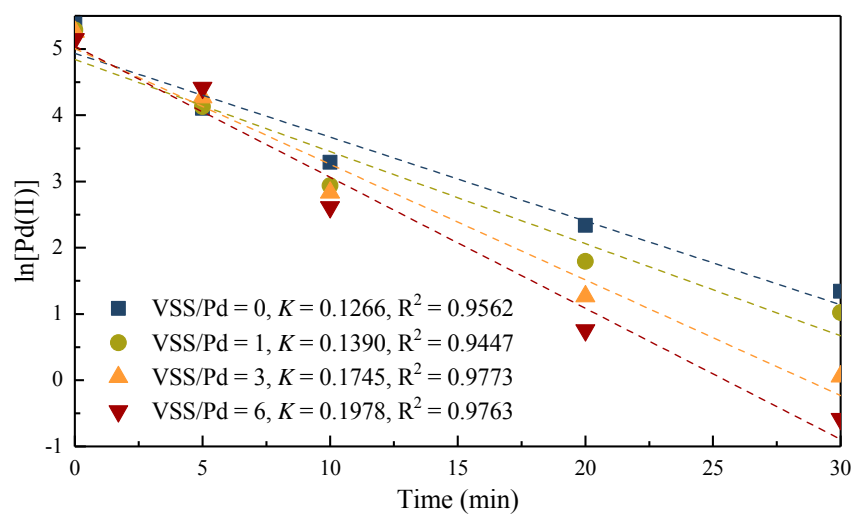


Fig. S2 $\ln[\text{Pd(II)}]$ over time for the reduction of Pd(II) at different VSS/Pd, during the initial 30 min with H_2

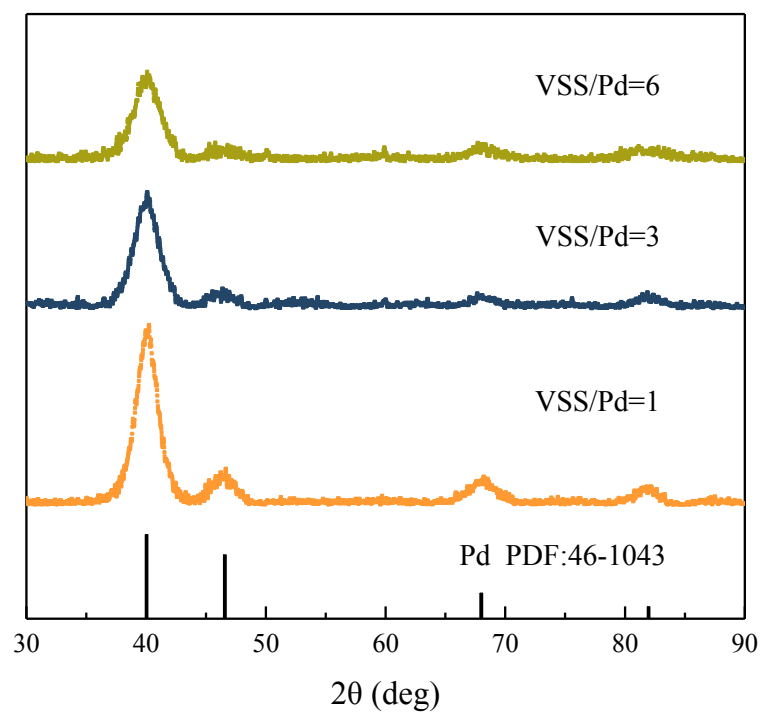


Fig. S3 XRD patterns of bio-Pd at different VSS/Pd, in the range of $2\theta = 30^\circ - 90^\circ$

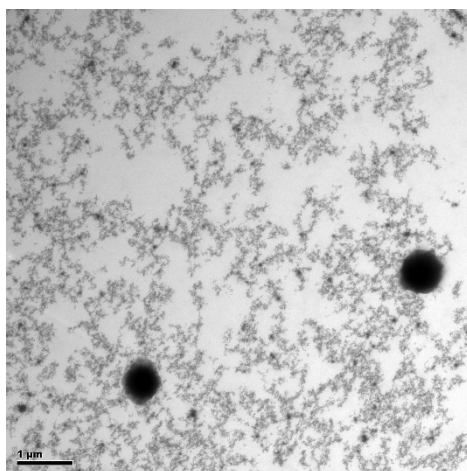


Fig. S4 TEM images of forming PdNPs in the solution without microbe. Note the black bar for scale is 1 μm in length

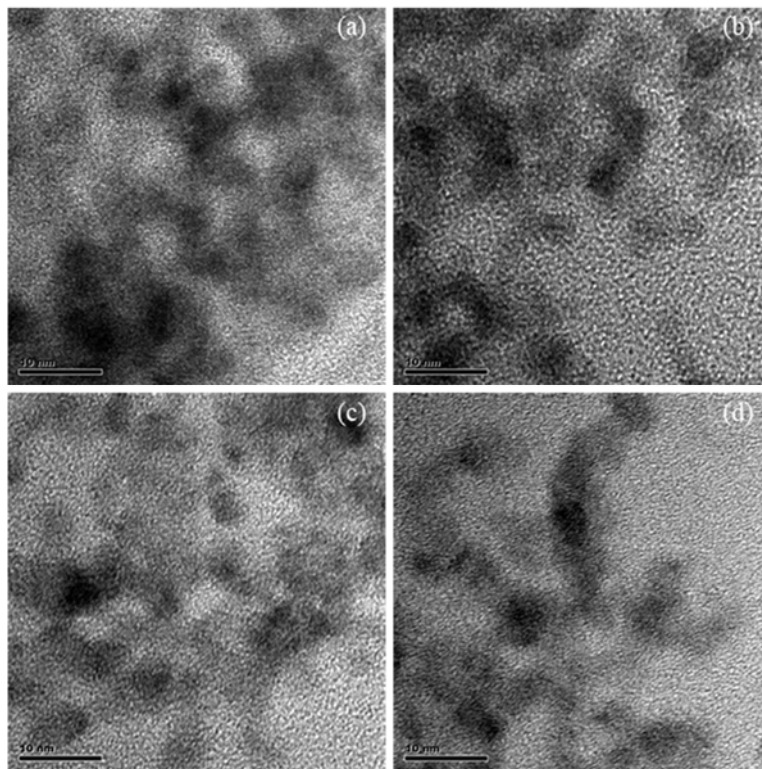


Fig. S5 HRTEM images of forming Pd NPs at VSS/Pd = 0 (a), VSS/Pd = 1 (b), VSS/Pd = 3 (c), VSS/Pd = 6 (d). Note the black bar for scale is 10 nm in length

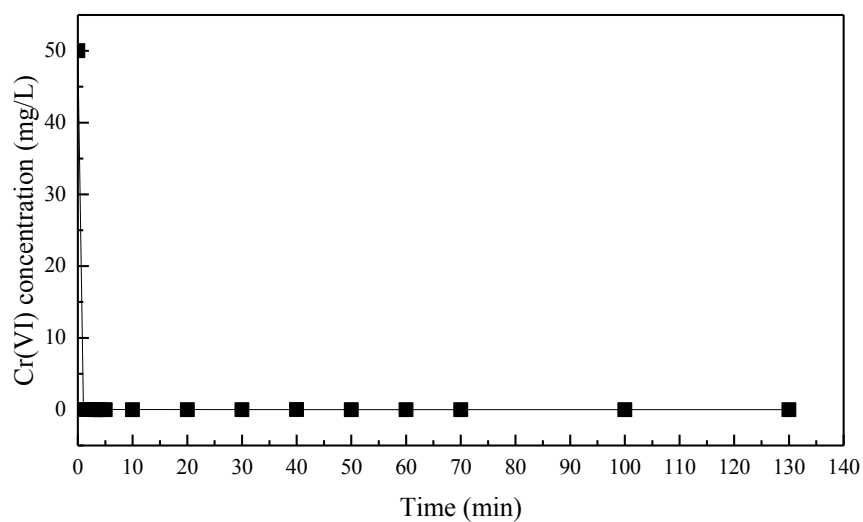


Fig. S6 Cr(VI) concentration over time at VSS/Pd = 10, during the 130 min with H₂. Error bars represent standard deviation of duplicate experimental time series

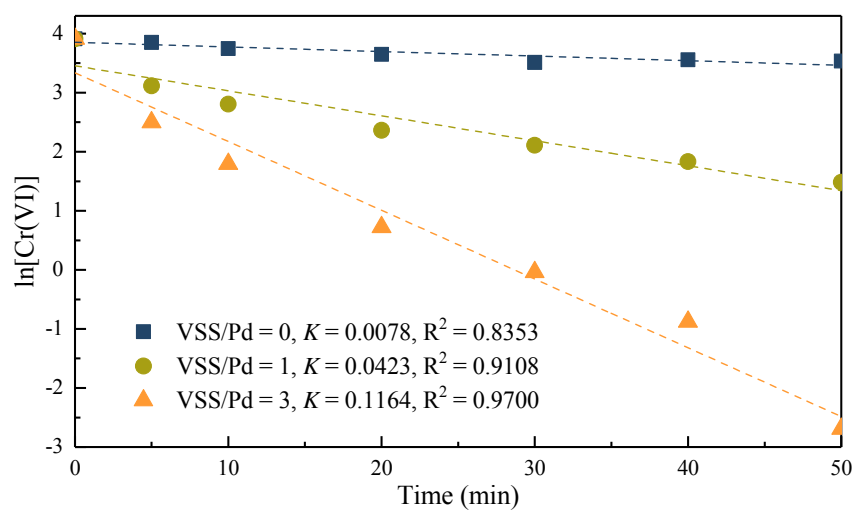


Fig. S7 $\ln[\text{Cr(VI)}]$ over time for the reduction of Cr(VI) at different VSS/Pd, during the initial 50 min with H_2

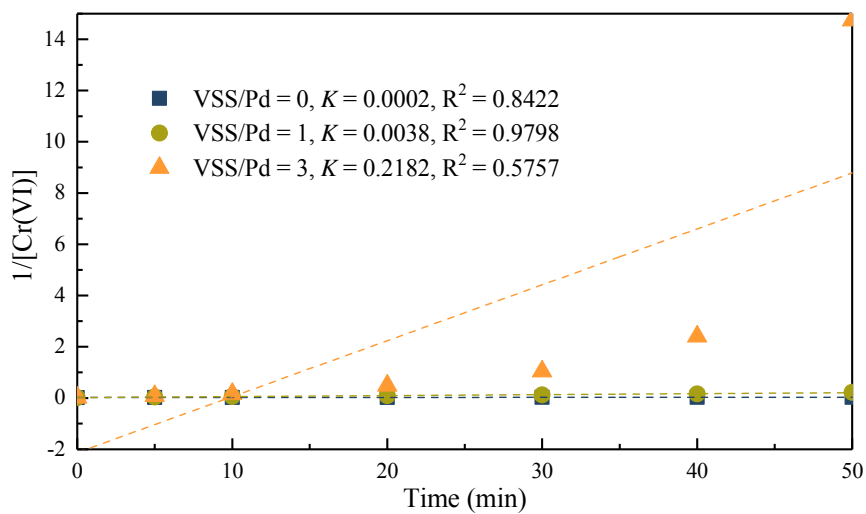


Fig. S8 $1/[\text{Cr(VI)}]$ over time for the reduction of Cr(VI) at different VSS/Pd, during the initial 50 min with H_2