Electronic Supplementary Material (ESI) for Dalton Transactions.

Plasmonic MoO_2 embedded $MoNi_4$ nanosheets prepared by $NiMoO_4$ transformation for visible-light-enhanced 4-nitrophenol reduction

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Supporting information:

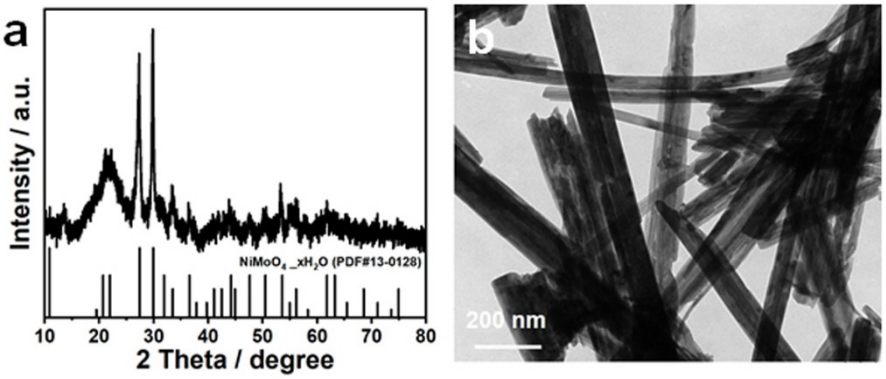

Fig. S1 (a) XRD pattern and (b) TEM image of the as-synthesized $NiMoO_4$ precursor by the hydrothermal reaction between $Ni(NO_3)_2$ and Na_2MoO_4.

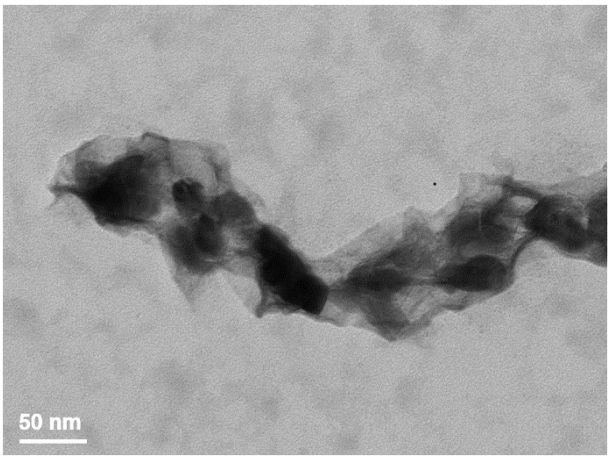

Fig. S2 TEM image of $MoNi_4$-MoO_2 hybrid catalysts.

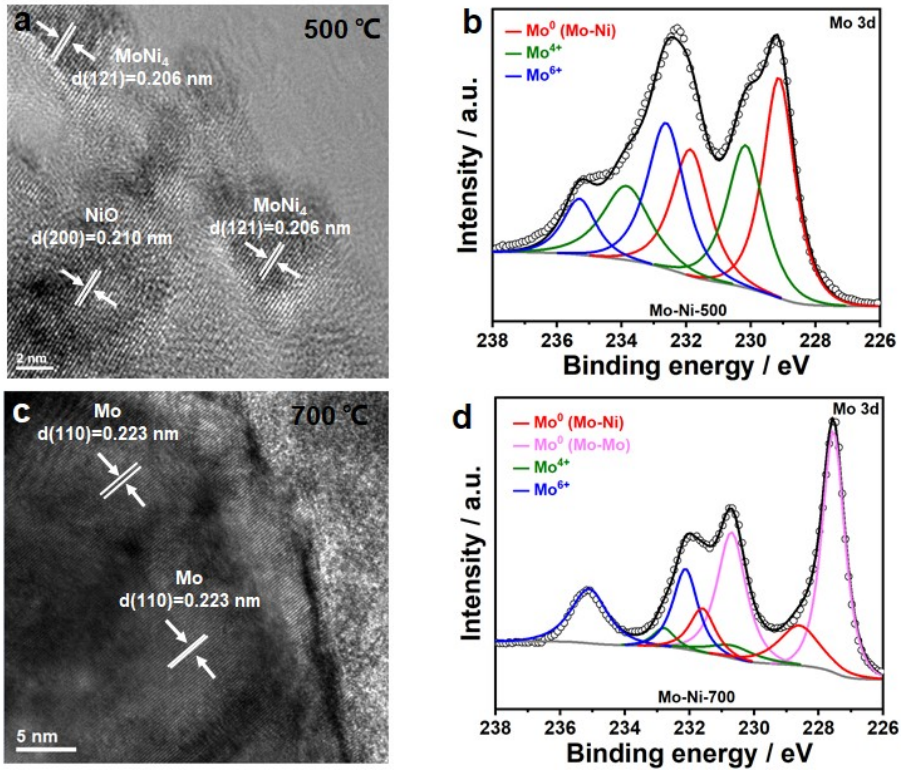

Fig. S3 HRTEM images and Mo 3d XPS spectra of the products of $NiMoO_4$ reduction transformation at 500 ℃ (a, b) and 700 ℃ (c, d).

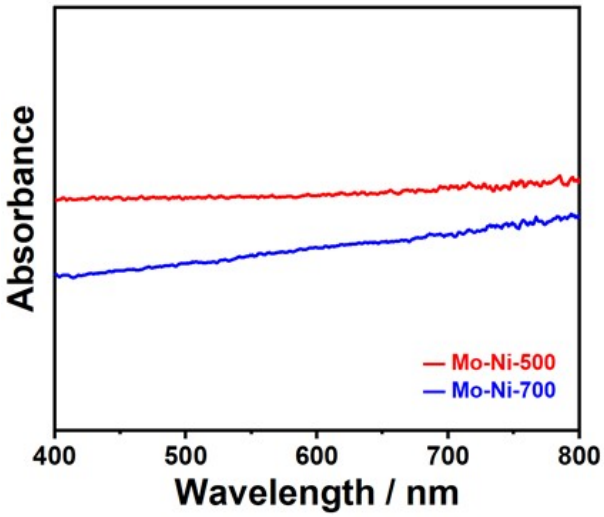

Fig. S4 Visible absorption spectra of the products of $NiMoO_4$ reduction transformation at 500 ℃ and 700 ℃.

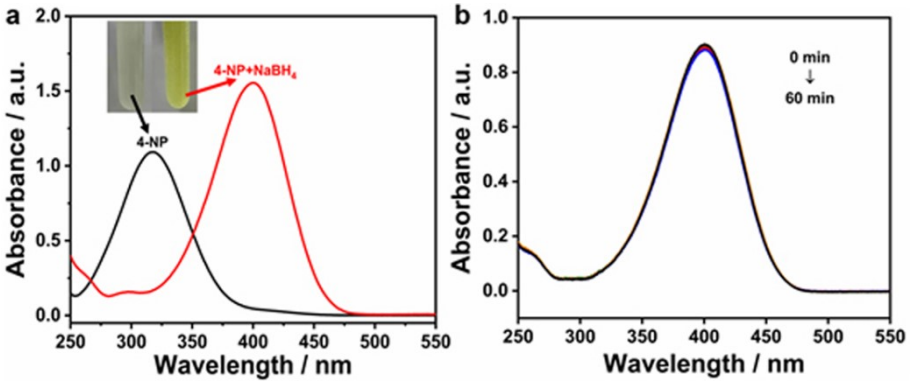

Fig. S5 UV-vis absorption spectra of (a) aqueous solution of p-nitrophenol, and upon adding excess $NaBH_4$. (b) Temporal evolution of the UV-vis absorption spectra of p-nitrophenol and $NaBH_4$ mixture in the absence of catalyst.

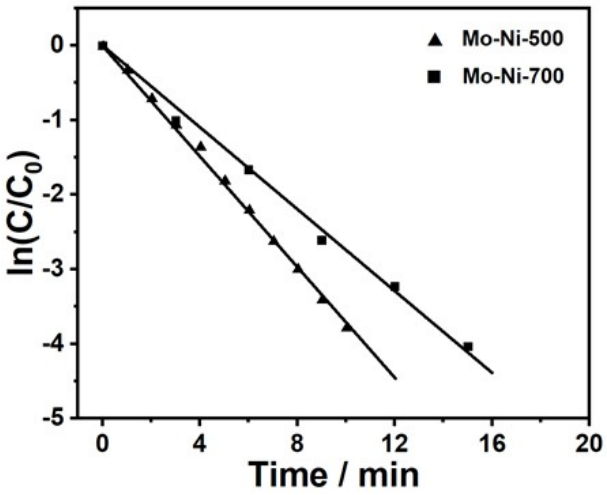

Fig. S6 Plots of $\ln(C/C_0)$ *versus* time for the reduction of 4-NP by $NaBH_4$ with the products of $NiMoO_4$ reduction transformation at 500 ℃ and 700 ℃ as catalysts in the dark.

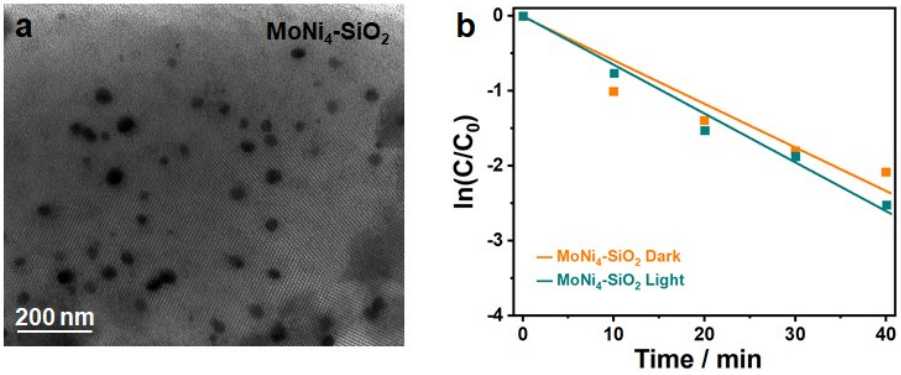

Fig. S7 (a) TEM image of $MoNi_4$-SiO_2 catalyst. (b) Plot of ln (C_t/C_0) *versus* time for the reduction of 4-NP into 4-AP by $NaBH_4$ with this catalyst.

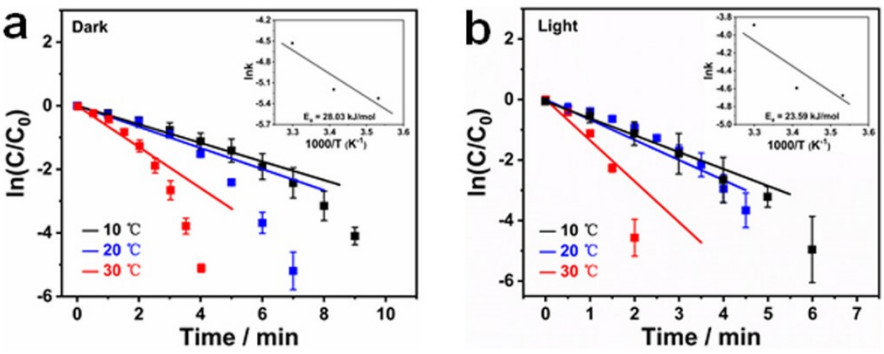

Fig. S8 (a) Plots of $\ln(C/C_0)$ vs. time for the conversion of 4-NP (0.9 mM) to 4-AP catalyzed by $MoNi_4$-MoO_2 (2.5 mg) under dark (a) and light irradiation conditions (b) at different temperatures (10 ℃, 20 ℃, and 30 ℃) with $NaBH_4$ (25 mM) in large excess. Arrhenius plots or activation energy calculations are shown as the inset. Each data points are average over three parallel experiments.

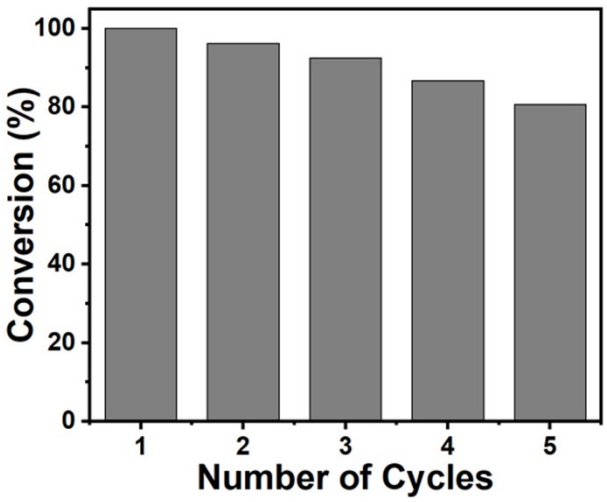

Fig.S9 The reusability of the $MoNi_4$-MoO_2 hybrid catalyst for the catalytic reduction of 4-NP under visible light irradiation condition.