Supporting Information

for Adv. Sci., DOI 10.1002/advs.202204109

In Situ Cutting of Ammonium Perchlorate Particles by Co-Bipy “scalpel” for High Efficiency Thermal Decomposition

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Keywords: Coordination polymer, ammonium Perchlorate, nano catalyst, structure self-transformation, catalytic mechanism
Fig. S1 SEM spectra of Co-bipy-2 (a), Co-bipy-2-600 (b) and Co-bipy-600 (c)

Fig. S2 TEM spectra of CoO/C.
Fig. S3. DSC curves of NH$_4$NO$_3$ catalyzed thermal decomposition of AP.

Fig. S4. TG curves of Co-bipy (a) and Co-bipy/AP (mass ratio is 1:1) (b).

Fig. S5. TG curves of Co-bipy-2.
Fig. S6. XRD of Co-bipy-2/Co-bipy-3 (a) and Co-bipy-2-600 (b).

Fig. S7. Crystal structure of Co-bipy.

Crystal data show that three N from 4,4-bipyridyl and four O from nitrate around Co(II) form a distorted pentagonal bipyramid structure. In the axial direction, each Co(II) coordinates with the N of two 4,4-bipyridines to form a one-dimensional long chain structure. The pyridine rings in 4,4-bipyridines twist each other by 38.2 °, and the Co-N bond length in this direction is 2.1251 Å. As shown in the figure, such one-dimensional chain has two groups of marks in the crystal, one of which has an angle of 54.8 ° with the axis, and the other has an angle of -54.8 °. Two long chains are connected on the axis by a 4,4-bipyridine to form a three-dimensional
double-layer structure. The Co-N bond length on the axis is 2.1347 Å. In the framework structure formed by Co(II) and 4,4-bipyridine, each Co(II) forms a coordination structure with two NO$_3^-$, and the two Co-O bond lengths formed by each NO$_3^-$ and Co(II) are 2.2261 Å and 2.3224 Å, respectively. H$_2$O molecules are filled between crystal structures, and there is no obvious bonding between H$_2$O molecules and frameworks. It can be seen that Co(II) and 4,4-bipyridine play a major role in forming the framework, and 4,4-bipyridine plays a role in forming one-dimensional long chains and bridging two long chains.$^{[32]}$.

Fig. S8. SEM spectra of Zn-bipy and Ni-bipy before and after heat treatment (heating rate 1 °C min$^{-1}$)
Fig. S9. Thermal Decomposition of AP Catalyzed by Ni-bipy (a) and Zn-bipy (b).