

Supplementary Material (ESI) for RSC Advances  
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## Two novel Anderson-type polyoxometalate-based metal-organic complexes with high-efficiency photocatalysis towards degradation of organic dyes under UV and visible light irradiation

Xiuli Wang,<sup>\*a</sup> Zhihan Chang, Hongyan Lin\*, Aixiang Tian, Guocheng Liu, Juwen Zhang, Danna

Liu

**Table S1.** Selected bond distances (Å) and angles (°) for the title complexes.

| Complex 1   |            |                      |            |
|---|------------|----------------------|------------|
| Cu(1)–N(1)  | 1.999(13)  | Cu(1)–O(1)           | 1.902(12)  |
| Cu(1)–O(2)#1  | 1.952(11)  | Cu(1)–O(1W)          | 1.891(11)  |
| O(1)–Cu(1)–N(1)   | 90.6(5)    | O(1)–Cu(1)–O(2)#1    | 90.6(5)    |
| O(2)#1–Cu(1)–N(1)   | 150.5(5)   | O(1W)–Cu(1)–O(1)     | 165.4(6)   |
| O(1W)–Cu(1)–N(1)  | 90.2(5)    | O(1W)–Cu(1)–O(2)#1   | 95.8(5)    |
| Symmetry code: #1 x+1, y, z   |            |                      |            |
| Complex 2   |            |                      |            |
| Cu(1)–N(1)  | 2.020(3)   | Cu(1)–O(1)           | 2.153(2)   |
| Cu(1)–N(1)#1  | 2.020(3)   | Cu(1)–O(1W)#1        | 2.187(3)   |
| Cu(1)–O(1)#1  | 2.153(2)   | Cu(1)–O(1W)          | 2.187(3)   |
| Cu(2)–O(3)#2  | 1.935(2)   | Cu(2)–O(2) #3        | 2.498(3)   |
| Cu(2)–O(3)#3  | 1.935(2)   | Cu(2)–O(2) #2        | 2.498(3)   |
| Cu(2)–N(3)  | 1.990(3)   | Cu(2)–N(3)#4         | 1.990(3)   |
| N(1)–Cu(1)–N(1)#1   | 170.91(16) | N(1)–Cu(1)–O(1W)#1   | 88.40(11)  |
| N(1)–Cu(1)–O(1)#1   | 93.52(10)  | N(1)#2–Cu(1)–O(1W)#1 | 85.88(11)  |
| N(1)#1–Cu(1)–O(1)#1   | 93.27(10)  | O(1)#1–Cu(1)–O(1W)#1 | 87.35(10)  |
| N(1)–Cu(1)–O(1)   | 93.27(10)  | O(1)–Cu(1)–O(1W)#1   | 170.65(11) |
| N(1)#1–Cu(1)–O(1)   | 93.52(10)  | N(1)–Cu(1)–O(1W)     | 85.88(11)  |
| O(1)#1–Cu(1)–O(1)   | 83.37(13)  | N(1)#1–Cu(1)–O(1W)   | 88.40(11)  |
| O(1)–Cu(1)–O(1W)  | 87.35(10)  | O(1)#1–Cu(1)–O(1W)   | 170.65(11) |
| O(1W)#1–Cu(1)–O(1W)   | 101.94(17) | O(3)#2–Cu(2)–N(3)#4  | 87.50(11)  |
| O(3)#2–Cu(2)–O(3)#3   | 92.95(14)  | O(3)#4–Cu(2)–N(3)#4  | 178.92(11) |
| O(3)#2–Cu(2)–N(3)   | 178.92(11) | N(3)–Cu(2)–N(3)#4    | 92.06(17)  |
| O(3)#3–Cu(2)–N(3)   | 87.50(11)  | O(2)#3–Cu(2)–O(2)#2  | 164.94(11) |
| O(2)#2–Cu(2)–N(3)#4   | 98.82(14)  | O(2)#2–Cu(2)–N(3)    | 91.64(13)  |
| O(2)#2–Cu(2)–O(3)#3   | 82.19(12)  | O(2)#2–Cu(2)–O(3)#2  | 87.45(12)  |
| O(2)#3–Cu(2)–N(3)   | 98.82(13)  | O(2)#3–Cu(2)–N(3)#4  | 91.64(14)  |
| O(2)#3–Cu(2)–O(3)#3   | 87.45(11)  | O(2)#3–Cu(2)–O(3)#2  | 82.19(13)  |
| Symmetry code: #1 -x,y,-z+1/2; #2 -x+1/2,y-1/2,-z+3/2; #3 x+1/2, y-1/2, z; #4 -x+1,y,-z+3/2 |            |                      |            |

Table S2 the BVC results of the Mo centers in the title complexes

| Complex 1 |                    |
|-----------|--------------------|
| Atom      | calculated valence |
| Mo1       | 6.2310             |
| Mo2       | 6.1299             |
| Mo3       | 6.0028             |
| Mo4       | 6.0779             |
| Mo5       | 6.2118             |
| Mo6       | 5.9174             |

| Complex 2 |                    |
|-----------|--------------------|
| Atom      | calculated valence |
| Mo1       | 5.9398             |
| Mo2       | 6.0334             |
| Mo3       | 5.9669             |

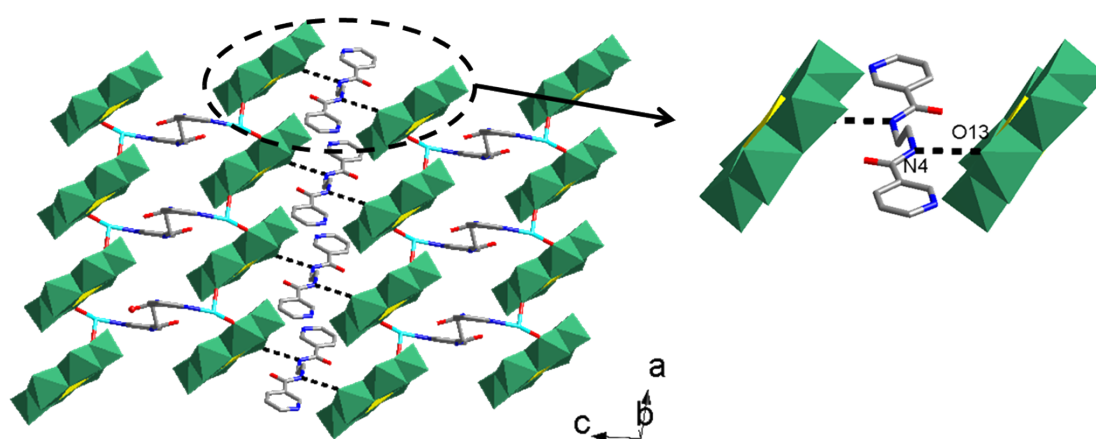


Fig. S1. The 2D supramolecular network of 1.

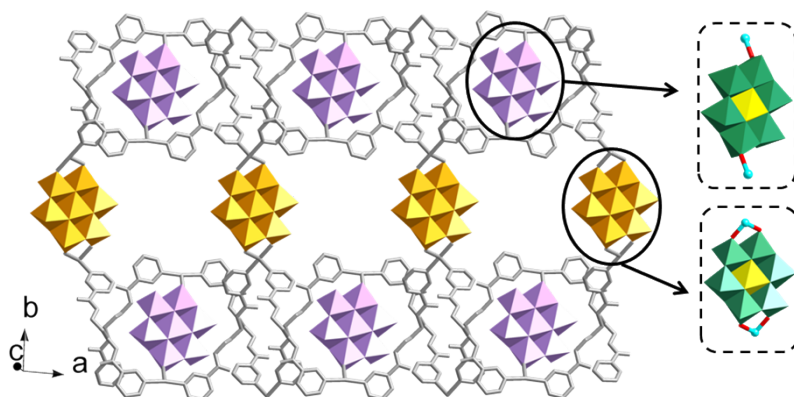


Fig. S2. Two different coordination modes of  $\text{CrMo}_6$  anions in the 2D network of **2**.

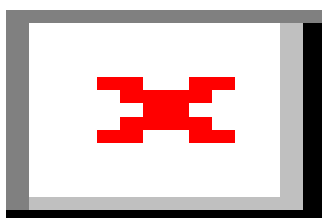


Fig. S3. The 3D framework of **2**.

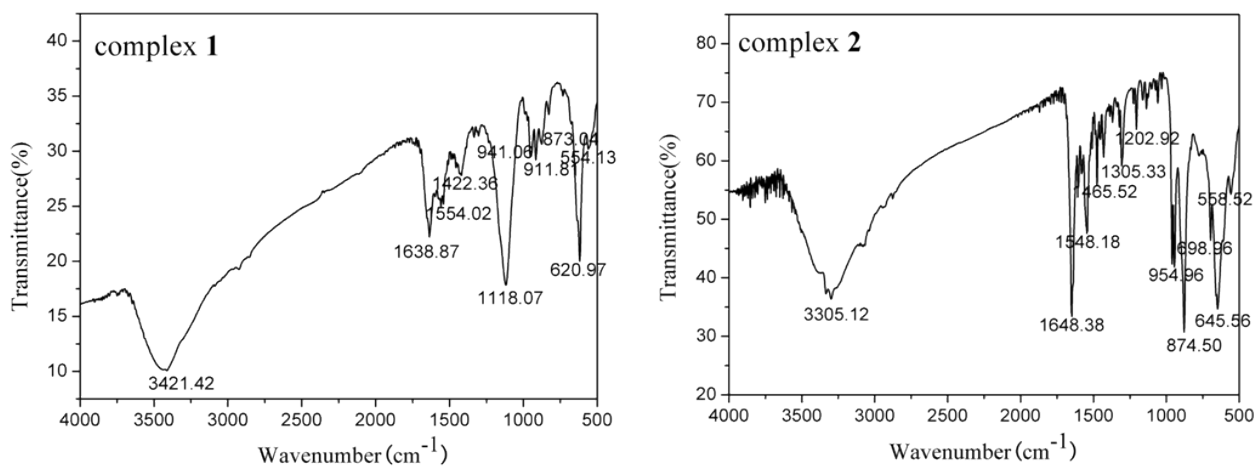


Fig. S4. The IR spectra of the title complexes.

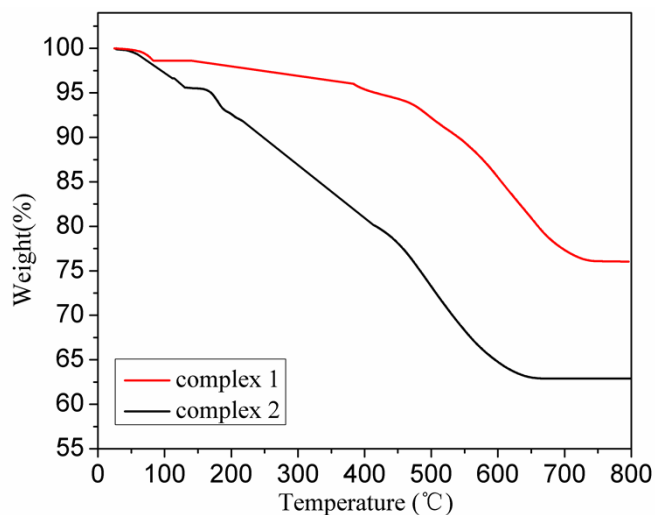


Fig. S5. The TGA curves of complexes 1 and 2.

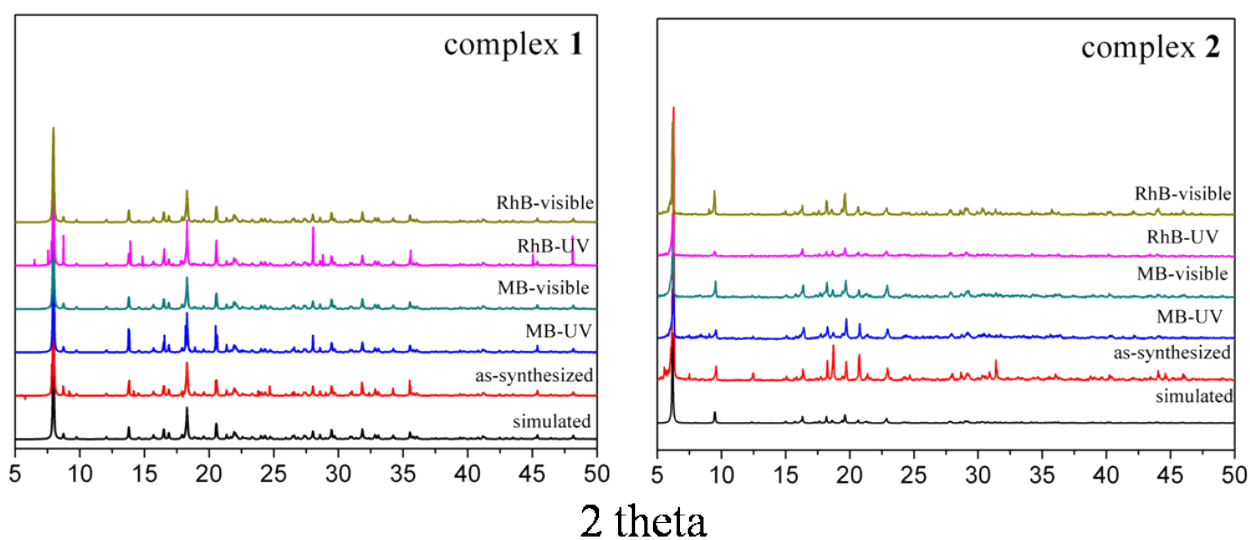


Fig. S6. Powder X-ray diffraction patterns of the title complexes before and after the photocatalytic reactions.

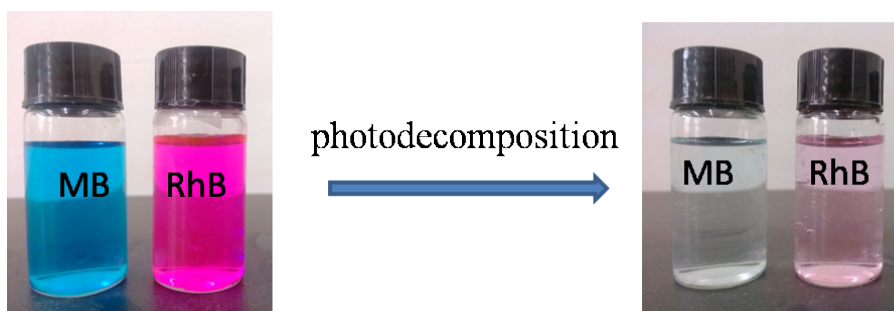


Fig. S7 The photographs of MB and Rhb solution before and after photodecomposition.