Supplementary Information

# Room-Temperature Ferromagnetism in Hierarchically Branched $MoO_3$ Nanostructures

**Yanchao Mao,[a] Wei Li,[a] Xiaofeng Sun,[a] Yijun Ma,[a] Jian Xia,[a] Yufeng Zhao,[a] Xihong Lu,[a] Jiayong Gan,[a] Zhaoqing Liu,[a,c] Jian Chen,[b] Peng Liu,[a]* and Yexiang Tong [a]***

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**TABLE S1: Raman Spectra Comparison of Our Branched $MoO_3$ Nanostructures[a] and Bulk $MoO_3$ Single Crystal.[b]**

| branched $MoO_3$ nanostructures /$cm^{-1}$ | bulk $MoO_3$ single crystal /$cm^{-1}$ |
|---|---|
| 994 | 998 |
| 817 | 822 |
| 664 | 668 |
| 468 | 473 |
| 375 | 381 |
| 335 | 338 |
| 282 | 285 |
| 244 | 247 |
| 214 | 219 |
| 196 | 200 |
| 157 | 160 |
| 126 | 131 |

[a] Branched $MoO_3$ nanostructures in this experiment. [b] See ref 1.

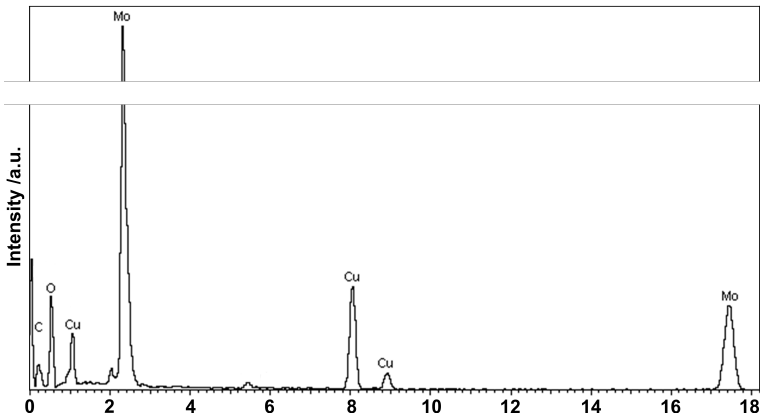


**Fig. S1** EDS spectrum of the as-deposited samples before annealing.

The composition of the as-deposited samples before annealing was also analyzed by EDS, as shown in Fig. S1. Except the C and Cu peaks originating from the TEM grid, only the elements Mo and O are detected in the as-deposited samples before annealing. The stoichiometry Mo/O in the samples is about 3/2. This result is consistent with the XRD data, which indicates that the as-deposited sample consists of amorphous molybdenum oxide.

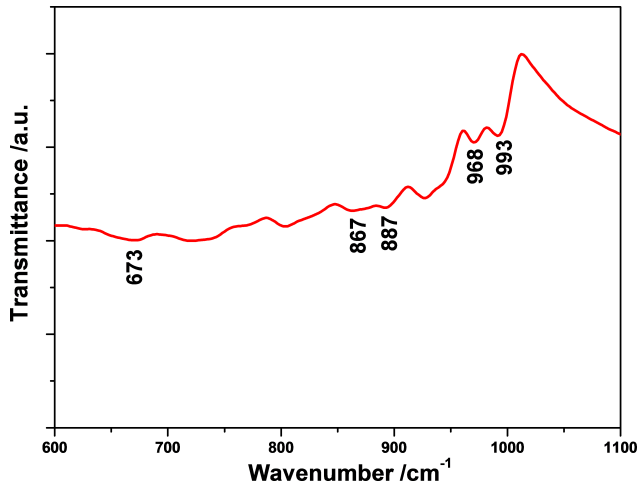


**Fig. S2.** FTIR spectrum of branched $MoO_3$ nanostructures.

Fig. S2 demonstrates the Fourier transform infrared (FTIR) spectrum of the branched $MoO_3$ nanostructures. The peak at 993 $cm^{-1}$ is assigned to a characteristic mode of the orthorhombic $MoO_3$.[2] The stretching mode of the Mo=O bond is located at 968 $cm^{-1}$,and the peak at 887 $cm^{-1}$ corresponds to

the stretching mode of the Mo atom with doubly connected O.[3] The signal at 867 $cm^{-1}$ is a result of the stretching vibration of the $O_{(3)}$ atoms linked to two Mo atoms.[4] The absorption band between 700 and 635 $cm^{-1}$ is associated with the bending mode of the O–Mo–O skeleton.[3]

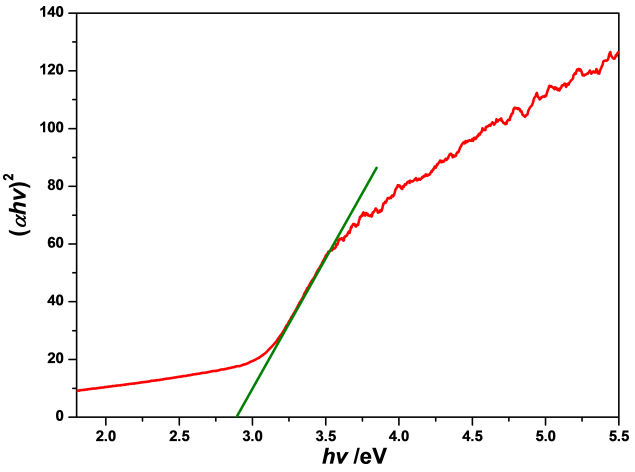


**Fig. S3.** $(\alpha h\nu)^2$ vs $h\nu$ curve for branched $MoO_3$ nanostructures.

## References

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