





# Room-temperature multiferroic behavior in layer-structured Aurivillius phase ceramics

Cite as: Appl. Phys. Lett. **117**, 052903 (2020); <https://doi.org/10.1063/5.0017781>

Submitted: 09 June 2020 . Accepted: 25 July 2020 . Published Online: 07 August 2020

Zheng Li, Vladimir Koval , Amit Mahajan, Zhipeng Gao, Carlo Vecchini, Mark Stewart, Markys G. Cain , Kun Tao, Chenglong Jia , Giuseppe Viola, and Haixue Yan 



View Online



Export Citation



CrossMark

## ARTICLES YOU MAY BE INTERESTED IN

[Intrinsic piezoelectricity in \(K,Na\)NbO<sub>3</sub>-based lead-free single crystal: Piezoelectric anisotropy and its evolution with temperature](#)

Applied Physics Letters **117**, 052904 (2020); <https://doi.org/10.1063/5.0012124>

[Current-induced bulk magnetization of a chiral crystal CrNb<sub>3</sub>S<sub>6</sub>](#)

Applied Physics Letters **117**, 052408 (2020); <https://doi.org/10.1063/5.0017882>

[Magnetic transition behavior and large topological Hall effect in hexagonal Mn<sub>2-x</sub>Fe<sub>1+x</sub>Sn \(x = 0.1\) magnet](#)

Applied Physics Letters **117**, 052407 (2020); <https://doi.org/10.1063/5.0011570>



**Measure Ready**  
**FastHall™ Station**

The highest performance tablet system for Hall bar samples

[Learn more](#)

Lake Shore  
CRYOTRON







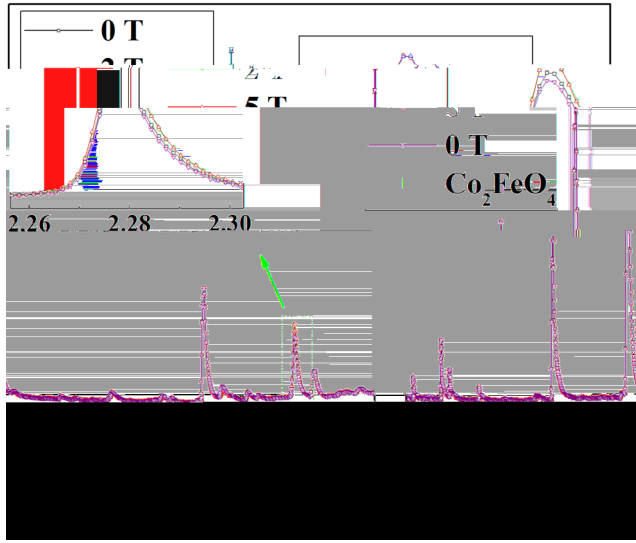


FIG. 4. XRD patterns of  $\text{Co}_2\text{FeO}_4$  at 0 T and 5 T. The inset shows the schematic of the sample and measurement setup.

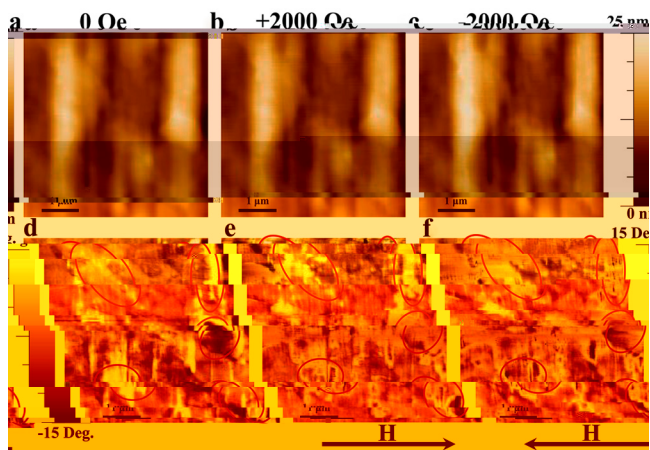
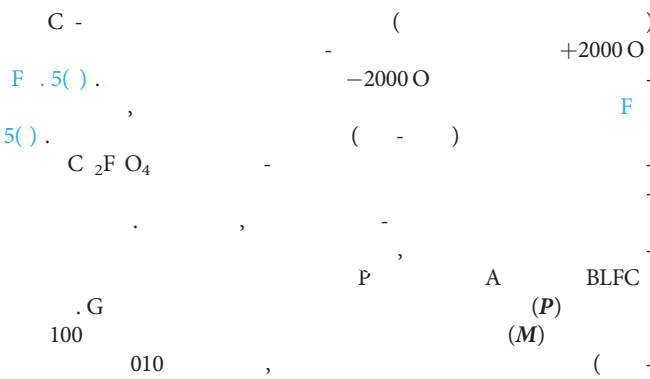


FIG. 5. MFM images of  $\text{Co}_2\text{FeO}_4$  at 0 Oe, +2000 Oe, and -2000 Oe. The inset shows the schematic of the sample and measurement setup.

$T = P \times M$   
 BLFC  
 I , A BLFC  
 F  
 $\text{C}^{3+} \text{O} \text{C}^{3+}, \text{F}^{3+} \text{O} \text{C}^{3+}$   $\text{F}^{3+} \text{O} \text{F}^{3+}$   
 A , C / F  
 EM (ED ) BLFC  
 D . M , P D . K , D.  
 D I H I I N , AL,  
 D , O K.  
 A E D F  
 G A A (G N . 2/  
 0038/20), C (G N . K2015-0602006), N FC (G  
 N . 11474138 11834005). A  
 E M P (EM P)  
 P IND54 N EM P  
 EM P E P AME E

DATA AVAILABILITY

REFERENCES

1. E , N. D. M , J. F. , *N* **442**, 759 (2006).
2. N. A. , *N . M* **6**, 21 (2007).
3. J. M. , J. H. , L. C. , *N . A . M* **23**, 1062 (2011).
4. L. F. H , O. C , J. B , J. L , C. H , H , O. G , D. C. L , H. , K , A. J. B , *A . F . M* **26**, 2111 (2016).
5. N. A. H , *J. P . C . B* **104**, 6694 (2000).
6. B. A , M : IL  
 $\text{B}_4\text{O}_3\text{O}_{12}$ , A . K **1**(58), 499 512 (1949).
7. A. , G. K , M. M. K , *J. P . C . M* **11**, 3335 (1999).
8. N. P G. K , *M . E . B* **108**, 194 (2004).
9. L. K , M , M. , A. A , N. D , N. P , P , M. E. P , D. J , *J. A . C .* **96**, 2339 (2013).
10. L. J. M , G , G. , K , A. M , L. C. J , C. N , H. , *D* **45**, 14049 (2016).
11. J. F. , *NPGA M* **5**, 72 (2013).
12. A. B C. E , *P . B* **90**, 214109 (2014).
13. J. B. L. , P. H , G. H , G. L , J. L , J. C , J. K. L , *A . P . L* **96**, 222903 (2010).
14. M , C , L , *A . P . L* **95**, 082901 (2009).
15. L. J. , L. , J. D , *A . P . L* **101**, 122402 (2012).

- <sup>16</sup>M. P. , P. C. , M. B. , A. P. B. , J. P. H. , K. , L. K. , M. P. , C. , H. K. , A. J. B. , *J. A. P.* **112**, 073919 (2012).
- <sup>17</sup>J. L. , H. , M. J. , K. , P. , *J. A. P.* **102**, 104107 (2007).
- <sup>18</sup>M. G. C. , *Characterisation of Ferroelectric Bulk Materials and Thin Films* ( , 2014), .2.
- <sup>19</sup>.L., K. , J. M. , .G. , .K. , C. J. , G. , H. , A. M. , J. C. , M. C. , I. A. , C. N. , C. J. , H. , *J. M. C. C* **6**, 2733 (2018).
- <sup>20</sup>.K. , I. , G. , M. , C. J. , H. , *J. P. C.* **122**, 15733 (2018).
- <sup>21</sup>L. J. , F. L. , , *J. A. C.* **97**, 1 (2014).
- <sup>22</sup>H. , F. I. , G. , H. N. , H. , J. , .G. , M. J. , *J. A. D.* **1**, 107 (2011).
- <sup>23</sup>J. , L. , .L. , . , J. D. , . , A. . *P. L.* **101**, 012402 (2012).
- <sup>24</sup>B. , J. , J. C. , .L. , . , J. D. , . , . , *A. P. L.* **104**, 062413 (2014).
- <sup>25</sup>L. P. M. , N. B. , . . **11**, 719 (2009).