



Fei Li was born in Xi'an, China and received his B.Eng in Electronic Science and Technology in 2006, followed by a Ph.D. in Microelectronics and Solid State Electronics in 2012, both from Xi'an Jiaotong University, China. His thesis focused on the design, modeling and fabrication of high-performance piezoelectric and ferroelectric materials applied for medical imaging transducers, piezoelectric actuators, etc.

After completion of his Ph.D, he joined in Electronic Materials Research Lab in Xi'an Jiaotong University (Lecturer: July 2012 - Marth 2015; Associate professor: April 2015 - Sep. 2018; Professor: Oct. 2018 - present). From Oct 2015 to Jun 2018, he worked in Materials Research Institute of the Pennsylvania State University as a Post doc/research associate, with co-supervised by Profs. Long-Qing Chen and Thomas R. Shrout. In Pennsylvania State University, his research mainly focused on two aspects, i.e., phase-field simulations of relaxor-ferroelectric materials and the fabrication of new high-performance piezoelectrics.

He moved back to Xi'an Jiaotong University in June 2018, and promoted to professor in Oct. 2018. He has served as an associated director of Electronic Materials Research Lab (EMRL) in Xi'an Jiaotong University from Sep 2019 to present. Currently, his research expertise and experience mainly lie on the electromechanical properties of ferroelectric crystals and ceramics. He has made significant contributions to the understanding of structure-property relationship and the development of relaxor-ferroelectric based crystals and ceramics.

Based on these works, he has published more than 100 peer reviewed papers in high-ranking journals, including *Nature*, *Science*, *Nature Materials*, etc., with over 11000 citation times from Google Scholar. His work has been presented at more than 30 national and international conferences and workshops through plenary (three times) and invited talks. He received the Outstanding Young Investigator Award from the Dielectric Physics Society of China (2018), the American Ceramic Society's Ross Coffin Purdy Award (2020), Star Ambassador Lectureship Award from the society of IEEE UFFC (2020) and IEEE Ferroelectric Young Investigator Award (2020).

He has been continually active for more than 10 years within the UFFC society and now is a senior member of IEEE. He was selected as the Chair of IEEE ferroelectrics awards committee in the year of 2022. In 2009, he attended the IEEE UFFC ISAF (International Symposium on Applications of Ferroelectrics) conference for the first time as a student volunteer in Xi'an, China. Since then, he attended the ISAF conference almost every year to present his research. He has been a member of Technical Program Committee for ISAF conference from the year of 2017 to present. As a co-organizer, he organized the International workshop on advanced dielectric and ferroelectric materials and devices, which was held in Xi'an, China on Oct 16-18, 2019. He served as an associate editor for *IEEE Transactions on Ultrasonic, Ferroelectric and Frequency Control* from January 2020. As a leading guest editor, he organized a special issue for *IEEE T UFFC*, entitled "Recent advances in piezoelectric materials for electromechanical transducer applications", to celebrate the 100th anniversary of the discovery of Ferroelectrics. He has severed as a reviewer for ferroelectric community for more than 10 years and the severed publications included *IEEE Transactions on Ultrasonic, Ferroelectric and Frequency Control*, *Science*, *Nature Communications*, *Journal of the American Chemical Society*, *Applied Physics Letters*, *Journal of Applied Physics*, *Journal of the American Ceramic Society*, etc.

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Education

Doctor Degree September 2006 – June 2012
Microelectronics and Solid State Electronics, Xi'an Jiaotong University

Bachelor Degree September 2002 - July 2006
Electronic Science and Technology, Xi'an Jiaotong University, China

Academic Experience

Professor Aug 2018 – present
School of Electronic Science and Engineering, Xi'an Jiaotong University

Associate Professor April 2015 – July 2018
School of Electronic Science and Engineering, Xi'an Jiaotong University

Lecturer June 2012 – April 2015
School of Electronic Science and Engineering, Xi'an Jiaotong University

Research associate Jan 2017 – June 2018
Materials Research Institute, The Pennsylvania State University, US.

Postdoctoral fellow Oct 2015 – Dec 2016
Materials Research Institute, The Pennsylvania State University, US

Visiting student Sep 2009 – Sep 2010
Materials Research Institute, The Pennsylvania State University, US

Research objectives

Investigations on ferroelectric and piezoelectric materials, particularly relaxor-PT based ceramics and single crystals. Research including: (1) Fundamental understanding on structure-property relationship for ferroelectrics; (2) R&D of ferroelectric materials for piezoelectric, dielectric, electro-optical and energy harvesting applications; (3) phase-field simulations of local structure, ferroelectric domains, domain walls and their contribution to electromechanical properties for ferroelectrics, especially for relaxor ferroelectrics.

Honors and Awards

1. Li F. Young Scientist Award of Fok Ying Tung Education Foundation (2022)
2. Li F, Xu Z, Zhang N, Qiu C. The Top Ten Scientific Discoveries of China, Ministry of Science and Technology of China, (2020)
3. Li F, IEEE Ferroelectrics Young Investigator Award, IEEE UFFC (2020)
4. Li F, Lin D, Chen Z, Cheng Z, Wang J, Li C, Xu Z, Huang Q, Liao X, Chen LQ, Shrouf TR & Zhang S, Ross Coffin Purdy Award, The American Ceramic Society (2020)
5. Li F, IEEE UFFC Star Ambassador Lectureship Award, IEEE UFFC (2020).
6. Li F, Outstanding Young Investigator Award, Dielectric Physics Society of China (2018).
7. Li F, The outstanding scientist in Shaanxi province of China, The government of Shaanxi (2017).
8. Yao X, Xu Z, Wei X, Li Z and Li F, The Second Prize of National Natural Science Award of China, The State Council of China (2015).
9. Xu Z, Li Z, Wei X, Feng Y, Yao X, Li F, Wang L, Xia S and Jin L, The First Prize of Ministry of Education Natural Science Award in China Ministry of Education of China (2014).
10. Li F, The excellent doctoral Ph. D dissertation of Shaanxi Province, The government of

Shaanxi (2014).

11. **Li F**, Outstanding PhD Student in Xi'an Jiaotong University (2010).

Research Funding (PI)

1. "Optimization of electromechanical properties for relaxor-PT ferroelectric crystals", the National Natural Science Foundation of China, 2020-2022, 1200k RMB.
2. "Rare-earth doped PMN-PT crystals", the Natural Science Foundation of Shaanxi province, 2019-2021, 900k RMB.
3. "Piezoelectric actuators", Ministry of Education of China, 2018-2020, 800k RMB.
4. "Studies on abnormal piezoelectricity reduction and dielectric relaxation at cryogenic temperature for relaxor-PT crystals", the National Natural Science Foundation of China, 2016-2019, 760k RMB.
5. The International Postdoctoral Exchange Fellowship Program, the Office of China Postdoctoral Council, 2016-2017, 300k RMB.
6. "Investigation of shear piezoelectric activities of relaxor-PT crystals", the National Natural Science Foundation of China, 2012-2015, 250k RMB.
7. "Thickness dependence of piezoelectric response in relaxor-PT crystals", the Office of China Postdoctoral Council, 2012-2014, 150k RMB.
8. "Characterization of ferroelectric phases and domain structures for relaxor-PT crystals", the Office of China Postdoctoral Council, 2012-2014, 50k RMB.

Service for Scientific Journals

- Associate Editor, IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control
- Board Member, Journal of Advanced Dielectrics

Conference Organization

1. International workshop on advanced dielectric and ferroelectric materials and devices, Xi'an, China, Oct 16-18, 2020. **Organizing Committee**
2. 2017-2020 Joint ISAF Conference. **ISAF TPC group member**

Conference Presentations

1. Shuai Yang, Jinglei Li, Dabin Lin, Yao Liu, Mingwen Wang, Liao Qiao, Xiangyu Gao¹, Yunfei Chang, Hongliang Du, Zhuo Xu, Shujun Zhang, **Fei Li**. "Textured ferroelectric ceramics with high electromechanical coupling factors over a broad temperature range", The 22nd American Conference on Crystal Growth and Epitaxy (ACCGE-22), August 2 to August 4, 2021. **Invited Talk**
2. Shuai Yang, Jinglei Li, Dabin Lin, Yao Liu, Mingwen Wang, Liao Qiao, Xiangyu Gao¹, Yunfei Chang, Hongliang Du, Zhuo Xu, Shujun Zhang, **Fei Li**. "Textured ferroelectric ceramics with high electromechanical coupling factors over a broad temperature range". The 13th China-Japan Symposium on Ferroelectric Materials and Their Applications (CJFMA-13), Oct. 24 to Oct. 26, 2021. **Invited Talk**
3. **Li F**, Zhang S, Xu Z, Chen LQ. "Recent developments of relaxor-PT ferroelectric crystals and ceramics. AMF-AMEC 2021, July 7-9, 2021 (Virtual). **Plenary talk**
4. **Li F**. "Textured piezoelectric ceramics with high electromechanical coupling factors and broad temperature usage range", The national conference of dielectric physics, materials and

applications in China, April 9-12, 2021. **Invited Talk.**

5. **Li F**, Qiu C, Wang B, Zhang N, Zhang S, Liu J, Shrout TR, Chen LQ, Xu Z. “Transparent ferroelectric crystals with ultrahigh piezoelectricity”, The national conference of dielectric physics, materials and applications in China, April 9-12, 2021. **Plenary Talk.**
6. **Li F**, Qiu C, Wang B, Zhang N, Zhang S, Liu J, Shrout TR, Chen LQ, Xu Z, “Unravel the mystery of a.c. poling on relaxor-PT crystals”, Electronic Materials and Applications 2021 (EMA 2021) conference, Jan 19-22, 2021 (Virtual) **Invited Talk**
7. Qiu C, Wang B, Zhang N, Zhang S, Liu J, Shrout TR, Chen LQ, Xu Z and **Li F**, “Unravel the mystery of a.c. poling on relaxor-PT crystals”, 2021 International Workshop on New Domain Technology of Ferroelectric Materials and Their Applications, January 23rd, 2021 (Virtual).
8. **Li F**. “Transparent ferroelectric crystals with ultrahigh piezoelectricity”, The young scientist conference of crystal growth in China, Nov 20-23, 2020. **Plenary Talk.**
9. **Li F**, “Transparent ferroelectric crystals with ultrahigh piezoelectricity”, Youth Forum of Institute of Microelectronics, Chinese Academy of Sciences, Oct 10, 2020. **Plenary Talk.**
10. **Li F**, Qiu C, Wang B, Zhang N, Zhang S, Liu J, Shrout TR, Chen LQ, Xu Z, Effect of AC electric field poling on relaxor-PT crystals, Electronic Materials and Applications 2020 (EMA 2020) conference, Jan 22-24, 2020, Orlando, US. **Invited Talk**
11. **Li F**, Qiu C, Wang B, Zhang N, Zhang S, Liu J, Shrout TR, Chen LQ, Xu Z, “Unravel the mystery of a.c. poling on relaxor-PT crystals,” IEEE IFCS ISAF 2020, Keystone, Colorado, USA, July 19-23, 2020. (Virtual)
12. Qiu C, Wang B, Zhang N, Zhang S, Liu J, Shrout TR, Chen LQ, Xu Z and **Li F**, “High performance transparent ferroelectric crystals for photoacoustic transducer applications”, IEEE International Ultrasonics Symposium 2020, Las Vegas, US, September 7-11, 2020. (Virtual)
13. Qiu CR, Wang B, Zhang SJ, Xu Z, Chen LQ, **Li F**, “The impact of AC poling on relaxor-PT crystals”, 2019 International Workshop on Atomic Force Microscopy for Advanced Functional Materials, Guangzhou, China, Dec 13-15, 2019. **Invited Talk**
14. **Li F**, “The impact of AC poling on relaxor-PT crystals”, 2019 International Workshop on Atomic Force Microscopy for Advanced Functional Materials, Guangzhou, China, Dec 13-15, 2019. **Invited Talk**
15. **Li F**, “The relationship between relaxor and high piezoelectricity”, The Chinese Physical Fall Meeting, Zhengzhou, China, Sep 21-24, 2018 **Invited Talk**
16. **Li F**, “Modified Relaxor Ferroelectrics with enhanced polar state heterogeneity”, The 6th International Workshop on Relaxor Ferroelectrics (IWRP-2018), Vancouver, Canada, July 17-21, 2018. **Invited Talk**
17. **Li F**, “The origin of ultrahigh piezoelectricity in relaxor-PT crystals”, The Chinese Physical Fall Meeting, Dalian, China, Sep 16-19, 2018 **Invited Talk**
18. **Li F**, “Modified Relaxor Ferroelectrics with enhanced polar state heterogeneity”, 2018 Joint IEEE ISAF-IWATMD-PFM Conference, Hiroshima, Japan , May 27 – June 1, 2018. **Invited Short Talk**
19. **Li F**, Zhang SJ, Xu Z, Chen LQ, and Shrout TR, “The Contribution of Polar Nanoregions to Piezoelectricity in Relaxor-PT Crystals and Ceramics”, 2017 Joint IEEE ISAF-IWATMD-PFM Conference, Atlanta, GA, USA, May 7-11, 2017. **Invited Talk**
20. **Li F**, Zhang SJ, Chen LQ, and Shrout TR, “Origin of Ultrahigh Piezoelectricity in relaxor-PT solid solution crystals”, Electronic Materials and Application 2017, Orlando, FL, USA, Jan 17-20, 2017. **Invited Talk**

21. **Li F**, Zhang SJ, Luo J, Geng XC, and Shrout TR, “[111] Orientated PIN-PMN-PT Crystals with Ultrahigh Dielectric Permittivity for High-Frequency Ultrasonic Arrays”, 13th Annual Ultrasonic Transducer Engineering Conference, Torrance, CA, May 16-17, 2016. **Invited Talk**.
22. **Li F**, Zhang SJ, Luo J, Chen LQ, and Shrout TR, “Ultrahigh Electromechanical Properties of Relaxor-PbTiO₃ Crystals from Polar Nanoregions: Experimental Characterization and Phase Field Simulation”, 2016 INTERNATIONAL WORKSHOP ON ACOUSTIC TRANSDUCTION MATERIALS AND DEVICES, State College, PA, US, May 10-12, 2016. **Oral Presentation**
23. **Li F**, Xu Z, Zhang SJ, “Piezoelectricity in Perovskite Ferroelectric Crystals”, Electronic Materials and Application 2015, Orlando, FL, USA, Jan 21-23, 2015. **Invited Talk**
24. **Li F**, Zhang SJ, “Electrostrictive effect of PMN-PT crystals”, ISAF-2014, Penn State University, PA, USA, May 12-17, 2014. **Oral Presentation**
25. **Li F**, Jin L, Xu Z, Zhang SJ, “Electrostrictive effect in relaxor-PT crystals”, the Conference of China Russia Workshop on Dielectric and Ferroelectric Materials & International Workshop on Relaxor Ferroelectric Single Crystal (Xi’an, China, 2013). Poster (selected as **Best Poster**)
26. **Li F**, Zhang SJ, Li ZR, Wang LH, and Xu Z, “Temperature Independent shear piezoelectric response (d_{24}) in Relaxor-PT based Crystals”, the fourteenth national dielectric physics, materials and Applications Conference of China, in Wuhan, China, on Nov 2-4, 2012. **Oral Presentation**
27. **Li F**, Zhang SJ, Xu Z, Shrout TR, “Shear Piezoelectric Response in Ferroelectric Crystals and Polycrystalline Ceramics” ISAF-PFM-2011 Joint International Conference in Vancouver, British Columbia, Canada, on July 24-27, 2011. **Oral Presentation**
28. **Li F**, Zhang SJ, Luo J, Hackenberger W, and Shrout TR, ‘Electromechanical Properties of Tetragonal Pb(In_{1/2}Nb_{1/2})O₃-Pb(Mg_{1/3}Nb_{2/3})O₃-PbTiO₃ crystals’, US Navy Workshop on Acoustic Transduction Materials and Devices, The Penn State Conference Center, State College, PA, May, 2010. **Oral Presentation**
29. **Li F**, Xu Z, Li Z, Lin D, “Temperature and D.C. bias field dependence of the piezoelectric effect in soft and hard doped piezoelectric lead zirconate titanate ceramics”, The MRS International Materials Research Conference, in Chongqing, China, on June 11-14, 2008. **Oral Presentation**
30. **Li F**, Wei XY, Feng YJ, Xu Z, “Influence of mechanical loss on the impedance spectrum of piezoelectric vibrator and the conventional resonance method”, Symposium on Piezoelectricity, Acoustic Waves and Device Applications, in Nanjing, China, on Nov 11-13, 2008. **Oral Presentation**

Publication list (>100 SCI papers, Citation > 11000, h-index: 44) Website in Google Scholar:

<https://scholar.google.com/citations?user=hVUMGroAAAAJ&hl=zh-CN>

1. Liu X, Tan P, Ma X, Wang D, Jin X, Liu Y, Xu B, Qiao L, Qiu C, Wang B, Zhao W, Wei C,⁷ Song K, Guo H, Li X, Li S, Wei X, Chen LQ, Xu Z, **Li F***, Tian Hao*, and Zhang S*. Ferroelectric crystals with giant electro-optic property enabling ultracompact Q-switches. *Science*, **376**, 371-377 (2022)
2. **Li F***, Breaking symmetry for piezoelectricity. *Science*, **375**, 618 (2022)
3. Yang S, Li J*, Liu Y, Wang M, Qiao L, Gao X, Chang Y, Du H, Xu Z, Zhang S, **Li F***. Textured Ferroelectric Ceramics with High Electromechanical Coupling Factors over a Broad Temperature Range. *Nature Communications*, **12**, 1414 (2021).
4. Wang B*, **Li F***, Chen LQ*. Inverse Domain-Size Dependence of Piezoelectricity in Ferroelectric Crystals. *Advanced Materials*, 2021, 202105071 (2021).

5. Gao X, Cheng Z, Chen Z, Liu Y, Meng X, Zhang X, Wang J, Guo Q, Li B, Sun H, Gu Q, Hao H, Shen Q*, Wu J*, Liao X, Ringer SP, Liu H, Zhang L, Chen W, **Li F*** & Zhang, S*. The mechanism for the enhanced piezoelectricity in multi-elements doped (K,Na)NbO₃ ceramics. *Nature Communications*, **12**, 881 (2021).
6. Huang Q, Chen Z, Cabral MJ, Wang F, Zhang S, **Li F**, Li Y, Ringer SP, Mai YW and Liao X*. Direct observation of nanoscale dynamics of ferroelectric degradation. *Nature Communications*, **12**, 2095 (2021).
7. Liu J, Gao X*, Qiu C, Qiao L, Yang J, Ma M, Song K, Guo H, Xu Z & **Li F***. High output power density and strong vibration durability in a modified barbell-shaped energy harvester based on multilayer Pb(In_{1/2}Nb_{1/2})O₃–Pb (Mg_{1/3}Nb_{2/3})O₃–PbTiO₃ single crystals. *APL Materials*, **9**, 010703 (2021).
8. Gao X*, Liu J, Xin B, Jin H, Luo L, Guo J, Dong S, Xu Z, **Li F***. A bending-bending mode piezoelectric actuator based on PIN-PMN-PT crystal stacks. *Sensors and Actuators: A. Physical*, **331**, 113052 (2021).
9. Wang T, Zhao X, Du H, Xia S, Li G, Guo H*, **Li F***, Xu Z*. Large-Area Piezoelectric Single Crystal Composites via 3-D-Printing-Assisted Dice-and-Insert Technology for Hydrophone Applications. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, **68**, 3241-3248 (2021)
10. Song K, Li Q, Guo H*, Hu Q, Li Z*, **Li F**, Fan S & Xu, Z. Composition and electrical properties characterization of a 5" diameter PIN-PMN-PT single crystal by the modified Bridgman method. *Journal of Alloys and Compounds*, **851**, 156145 (2021).
11. Tian F*, Liu Y, Ma R, **Li F**, Xu Z & Yang, Y. Properties of PMN-PT single crystal piezoelectric material and its application in underwater acoustic transducer. *Applied Acoustics*, **175**, 107827 (2021).
12. 王婷, **李飞***, 杜红亮, 夏颂, 徐卓*. 面向水声换能器的压电单晶复合材料设计研究. *人工晶体学报*, **6**, 997-1003 (2020).
13. **李飞***, 张树君, 徐卓. 压电效应——百岁铁电的守护者. *物理学报*, **69**, 73-85 (2020).
14. Qiu C, Wang B, Zhang N, Zhang S, Liu J, Walker D, Wang Y, Tian H, ShROUT TR, Xu Z*, Chen LQ*, **Li F***. Transparent Ferroelectric Crystals with Ultrahigh Piezoelectricity, *Nature*, **577**, 350-354 (2020).
15. Li J, Shen Z, Chen X, ..., Chang Y*, Zhang S*, **Li F***. Grain-orientation-engineered multilayer ceramic capacitors for energy storage applications. *Nature Materials*, **19**, 999-1005 (2020).
16. Chen Z#, **Li F#**, Huang Q, Liu F, Wang F, Ringer SP, Luo H, Zhang S*, Chen LQ, Liao X*. *Science Advances*, **6**, eabc7156 (2020).
17. Liu J, Qiu C, Qiao L, Song K, Guo H, Xu Z & **Li F***. Impact of alternating current electric field poling on piezoelectric and dielectric properties of Pb(In_{1/2}Nb_{1/2})O₃–Pb(Mg_{1/3}Nb_{2/3})O₃–PbTiO₃ ferroelectric crystals. *Journal of Applied Physics*, **128**, 094104 (2020).
18. Gao X*, Qiu C, Li G, Ma M, Yang S, Xu Z & **Li F***. High output power density of a shear-mode piezoelectric energy harvester based on Pb (In_{1/2}Nb_{1/2}) O₃-Pb (Mg_{1/3}Nb_{2/3}) O₃-PbTiO₃ single crystals. *Applied Energy*, **271**, 115193 (2020).
19. Li C, Xu B*, Lin D, Zhang S, Bellaiche L, ShROUT TR & **Li F***. Atomic-scale origin of ultrahigh piezoelectricity in samarium-doped PMN-PT ceramics. *Physical Review B*, **101**, 140102 (2020).
20. Li C*, Lin D, Zhang S, ShROUT TR & **Li F***. Revisiting the structural stability and

electromechanical properties in lead zinc niobate-lead titanate-barium titanate (PZN-PT-BT) ternary system. *Journal of the European Ceramic Society*, 40, 1236-1242 (2020).

21. Qiao L, Li G, Tao H, Wu J, Xu Z* & Li F*. Full characterization for material constants of a promising KNN-based lead-free piezoelectric ceramic. *Ceramics International*, 46, 5641-5644 (2020).
22. Li G, Tian F, Gao X, Tian H, Qiao L, Liu J, Li F* & Xu Z*. Investigation of High Power Properties of PIN-PMN-PT Relaxor-based Ferroelectric Single Crystals and PZT-4 Piezoelectric Ceramics. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*. 67, 1641-1646 (2020).
23. Chang Y*, Wu J, Liu Z, Sun E, Liu L, Kou Q, Li F*, Yang B*, and Cao W. Grain-Oriented Ferroelectric Ceramics with Single Crystal-Like Piezoelectric Properties and Low Texture Temperature[J]. *ACS Applied Materials & Interfaces*, 12, 38415–38424 (2020).
24. Shu L*, Ke S, Fei L, Huang W, Wang Z, Gong J, Jiang X, Wang L, Li F, ... & Catalan G*. Photoflexoelectric effect in halide perovskites. *Nature materials*, 19, 605-609 (2020).
25. Lv X, Zhang J, Liu Y, Li F, Zhang X & Wu J*. Synergetic Contributions in Phase Boundary Engineering to the Piezoelectricity of Potassium Sodium Niobate Lead-Free Piezoceramics. *ACS Applied Materials & Interfaces*, 12, 39455–39461 (2020).
26. Zhang Z, Su M, Li F, Liu R, Cai R, Li G, Jiang Q, Zhong H, Shrout TR, Zhang S, Zheng H & Qiu W. New Sm-PMN-PT Ceramic-based 2D Array for Low-intensity Ultrasound Therapy Application. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 67, 2085-2094 (2020).
27. Qiao L, Li Q, Qiu C, Liu Y, Liu J, Xu Z* & Li F*. Temperature Dependence of Elastic, Piezoelectric, and Dielectric Matrixes of [001]-Poled Rhombohedral PIN-PMN-PT Single Crystals. *IEEE Trans Ultrason Ferroelectr Freq Contr*, 66, 1786-1792 (2019).
28. Li F*, Cabral MJ, Xu B, Cheng Z, Dickey EC, LeBeau JM, Wang J, Luo J, Taylor S, Hackenberger W, Bellaiche L, Xu Z, Chen LQ, Shrout TR, Zhang S*. Giant Piezoelectricity in Sm-doped PMN-PT Crystals. *Science*, 364, 264-269 (2019).
29. Li, J., Chang, Y.*, Yang, S., Tian, Y., Hu, Q., Zhuang, Y., ... & Li F*. Lead-Free Bilayer Thick Films with Giant Electrocaloric Effect near Room Temperature. *ACS applied materials & interfaces*. 11, 23346-23352 (2019).
30. Pan H, Li F, Liu Y, Shunjun Zhang, Lin Gu..., Lin Y-H* and Nan C-W*, Ultrahigh-energy density lead-free dielectric films via polymorphic nanodomain design. *Science*, 365, 578-582 (2019).
31. Xu Z*, Li F, Zhang S, Stock C, Luo J, Gehring PM & Xu G. Electric field effect on short-range polar order in a relaxor ferroelectric system. *Physical Review B*, 100, 024113 (2019).
32. Tao, H., Wu, H., Liu, Y., Zhang, Y., Wu, J.*, Li, F.*, ... & Pennycook, S. J*. Ultrahigh performance in lead-free piezoceramics utilizing a relaxor slush polar state with multiphase coexistence. *Journal of the American Chemical Society*, 141, 13987-13994 (2019).
33. Li F*, Lin, D., Chen, Z., Cheng, Z., Wang, J., Li, C., Xu Z, Huang, Q., Liao, X., Chen, L.Q.*, Shrout, T. R. & Zhang, S*. Ultrahigh piezoelectricity in ferroelectric ceramics by design. *Nature Materials*, 17, 349–354 (2018).
34. Li F*, Zhang S., Damjanovic D, Chen L.Q., & Shrout T.R. Local Structural Heterogeneity and Electromechanical Responses of Ferroelectrics: Learning from Relaxor Ferroelectrics. *Adv. Funct. Mater.* 28, 1801504. (2018)

35. Li J., **Li F.***, Xu Z. & **Zhang S.J.***. Multilayer Lead-free Ceramic Capacitors with Ultrahigh Energy Density and Efficiency. *Adv. Mater.*,32, 1802155 (2018).
36. Hu D., Wang K., Wang L., Zhang M., Xu Z & **Li F.***. Preparation and characterization of $\text{Pb}(\text{Lu}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-PbTiO}_3$ ternary ferroelectric ceramics with high phase transition temperatures. *Journal of the American Ceramic Society*. 101, 5514-5523 (2019).
37. Zhang SJ, Li F, Yu, FP, Jiang XN, Lee HY, Luo J, Shrout TR. Recent Developments in Piezoelectric Crystals. *JOURNAL OF THE KOREAN CERAMIC SOCIETY*, 55, 419-439 (2018)
38. Lin D.*, Zhou S., Liu W., & **Li F.*** Thermal stability and electric - field - induced strain behaviors for PIN - PSN - PT piezoelectric ceramics. *Journal of the American Ceramic Society*, 101(1), 316-325 (2018).
39. **Li F.***, Zhang SJ*, Xu Z, and Chen LQ. The Contributions of Polar Nanoregions to the Dielectric and Piezoelectric Responses in Domain - Engineered Relaxor - PbTiO_3 Crystals. *Advanced Functional Materials*, 27, 1700310 (2017).
40. Zhang Z, **Li F**, Chen R, Zhang T, Cao X, Zhang S, Shrout TR, Zhou QF & Qiu W. High-performance ultrasound needle transducer based on modified PMN-PT ceramic with ultrahigh clamped dielectric permittivity. *IEEE transactions on ultrasonics, ferroelectrics, and frequency control*, 65(2), 223-230 (2017).
41. Liu J., **Li F.**, Zeng Y., Jiang Z., Liu L., Wang D.*, Ye Z.G. & Jia C.L. Insights into the dielectric response of ferroelectric relaxors from statistical modeling. *PHYSICAL REVIEW B* 96, 054115 (2017).
42. Shu L, Wan M, Jiang X, **Li F**, Zhou N, Huang W and Wang T. Frequency dispersion of flexoelectricity in PMN-PT single crystal. *AIP Advances* 2017, 7(1): 015010.
43. Zhu X, Yang L, Li J, Jin L, Wang L, Wei X, Xu Z, **Li F.***. The dielectric properties for (Nb, In, B) co-doped rutile TiO_2 ceramics. *Ceramics International*. 2017, 1, 43(8): 6403-9.
44. Lin D*, Zhang S., Gorzkowski E, Zhou S, Liu, W, and **Li, F.***. "Investigation of morphotropic phase boundaries in PIN-PSN-PT relaxor ferroelectric ternary systems with high T_r -t and T_c phase transition temperatures." *Journal of the European Ceramic Society* 37 (2017): 2813-2823.
45. Li J, **Li F.***, Zhu X, et al. Colossal dielectric permittivity in hydrogen-reduced rutile TiO_2 crystals, *J. Alloys Compounds*, 2017, 692: 375-380.
46. **Li F**, S. J. Zhang*, T. N. Yang, et al, The Origin of Ultrahigh Piezoelectricity in Relaxor-Ferroelectric Solid Solution Crystals, *Nat. Commun.*, 2016, 7, 13807.
47. J. C. Frederick, T. H. Kim, W. Maeng, A. A. Brewer, J. P. Podkaminer, W. Saenrang1, V. Vaithyanathan, **F. Li**, L.-Q. Chen, D. G. Schlom, S. Trolier-McKinstry, M. S. Rzchowski and C. B. Eom, Visualization of dielectric constant-electric field-temperature phase maps for imprinted relaxor ferroelectric thin films. *Appl. Phys. Lett.*, 2016, 108(13): 132902.
48. **Li F.***, Zhang S, Luo J, et al. [111]-oriented PIN-PMN-PT crystals with ultrahigh dielectric permittivity and high frequency constant for high-frequency transducer applications. *J. Appl. Phys.*, 2016, 120(7): 074105.
49. Li J, Xu Z, **Li F.***, et al. $\text{SiO}_2\text{-Ti}_{0.98}\text{In}_{0.01}\text{Nb}_{0.01}\text{O}_2$ composite ceramics with low dielectric loss, high dielectric permittivity and an enhanced breakdown electric field. *RSC Adv.*, 2016, 6(24): 20074-20080.
50. Li J, **Li F.***, Xu Z, et al. Nonlinear I-V behavior in colossal permittivity ceramic: (Nb+ In)

co-doped rutile TiO₂. *Ceram. Inter.*, 2015, 41: S798-S803.

51. Li J, **Li F***, Li C, et al. Evidences of grain boundary capacitance effect on the colossal dielectric permittivity in (Nb+In) co-doped TiO₂ ceramics, *Sci. Rep.*, 2015, 5: 8295
52. **Li F***, Wang LH, Jin L, Lin DB, Li JL, Li ZR, Xu Z and Zhang SJ*. Piezoelectric Activity in Perovskite Ferroelectric Crystals. *IEEE Trans Ultra Ferroelectr Freq Contr*, 2015, 62(1): 18-32.
53. Zhang SJ*, **Li F**, Jiang XN, Kim J, Luo J, and Geng XC. Advantages and challenges of relaxor-PbTiO₃ ferroelectric crystals for electroacoustic transducers – A review. *Prog Mater Sci*, 2015, 68: 1-66.
54. Jiang ZJ, Xu B, **Li F**, et al. Electric dipole sheets in BaTiO₃/BaZrO₃ superlattices. *Phys. Rev. B*, 2015, 91: 014105.
55. **Li F**, Jin L* and Guo R. High electrostrictive coefficient Q₃₃ in lead-free Ba(Zr_{0.2}Ti_{0.8})O_{3-x}(Ba_{0.7}Ca_{0.3})TiO₃ piezoelectric ceramics. *Appl Phys Lett*, 2014, 105: 232903.
56. **Li F***, Xu Z and Zhang SJ. The effect of polar nanoregions on electromechanical properties of relaxor-PT crystals: extracting from electric-field-induced polarization and strain behaviors, *Appl Phys Lett*, 2014, 105: 122904.
57. **Li F***, Wang LH, Jin L, Xu Z and Zhang SJ*. Achieving single domain relaxor-PT crystals by high temperature poling, *CrystEngComm*, 2014, 16: 2892.
58. **Li F**, Jin L, Xu Z and Zhang SJ*. Electrostrictive effect in ferroelectrics: an alternative approach to improve piezoelectricity, *Appl Phys Rev*, 2014, 1(1): 011103.
59. Li JL, **Li F***, Zhuang Y, Jin L, Wang LH, Wei XY, Xu Z, and Zhang SJ*. Microstructure and dielectric properties of (Nb+In) co-doped rutile TiO₂ ceramics, *J Appl Phys*, 2014, 116: 074105.
60. Jin L, **Li F**, and Zhang SJ*. Decoding the Fingerprint of Ferroelectric Loops: Comprehension of the Material Properties and Structures, *J Am Ceram Soc*, 2014, 97(1): 1-27.
61. Shu LL*, **Li F**, Huang WB, Wei XY, Yao X and Jiang XN. Relationship between direct and converse flexoelectric coefficients. *J Appl Phys*, 2014, 116: 144105.
62. Zhuang Y, **Li F**, Yang G, Xu Z, Li J, Fu B, Yang Y, and Zhang S*. Fabrication and Piezoelectric Property of BaTiO₃ Nanofibers, *J Am Ceram Soc*, 2014, 97: 2725-2730.
63. Wang LH*, Zhao S, Jin L, **Li F***, and Xu Z. Effects of InNbO₄ Fabrication on Perovskite PIN-PMN-PT, *J Am Ceram Soc*, 2014, 97: 3110-3115.
64. Gao JH*, Hu XH, Zhang L, **Li F***, Zhang LX, Wang Y, Hao YS, Zhong LS, and Ren XB. Major contributor to the large piezoelectric response in (1-x)Ba(Zr_{0.2}Ti_{0.8})O_{3-x}(Ba_{0.7}Ca_{0.3})TiO₃ ceramics: Domain wall motion, *Appl Phys Lett*, 2014, 104: 252909.
65. Lin DB, Li ZR*, **Li F**, Cai C, Liu W, and Zhang SJ*. Tetragonal-to-Tetragonal Phase Transition in Lead-Free (K_xNa_{1-x})NbO₃ (x = 0.11 and 0.17) Crystals, *Crystals*, 2014, 4: 113-122.
66. Lin DB, Li ZR*, **Li F**, Zhang SJ, Cai CL, Cheng YJ, and Xu Z. n-situ observation of domain wall motion in Pb(In_{1/2}Nb_{1/2})O₃-Pb(Mg_{1/3}Nb_{2/3})O₃-PbTiO₃ crystals. *J Appl Phys*, 2014, 116: 034105.
67. Shu LL, Huang W, Kwon SR, Wang Z, **Li F**, Wei XY, Zhang SJ, Lanagan M, Yao X, and Jiang XN*. Converse flexoelectric coefficient f₁₂₁₂ in bulk Ba_{0.67}Sr_{0.33}TiO₃, *Appl Phys Lett*, 2014, 104:232902.

68. **Li F***, Jin L, Xu Z and Zhang SJ*. Electrostrictive effect in $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})_{3-x}\text{PbTiO}_3$ crystals, *Appl Phys Lett*, 2013, 102(15): 152910.
69. Zhang SJ*, **Li F**, Luo J, et al. Relaxor- PbTiO_3 Single Crystals for Various Applications, *IEEE Trans Ultra Ferroelectr Freq Contr*, 2013, 60(8): 1572-1580.
70. Gao JJ, **Li F***, Xu Z, et al. Ferroelectric phase transitions and electromechanical properties of barium titanate and lead titanate crystals under uniaxial and shear stresses: a thermodynamic analysis, *J Phys D: Appl Phys*, 2013, 46(21): 215304.
71. Zhang SJ*, Taylor S, **Li F**, et al. Piezoelectric property of relaxor- PbTiO_3 crystals under uniaxial transverse stress, *Appl Phys Lett*, 2013, 102(17): 172902.
72. Zhang RZ*, Wang DW, **Li F**, et al. High performance lead free ferroelectric $\text{ATiO}_3/\text{SnTiO}_3$ superlattices, *Appl Phys Lett*, 2013, 103(6): 062905.
73. Lin D, Li Z*, **Li F**, Zhang SJ. Direct observation of domain wall motion and novel dielectric loss in $0.23\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3-0.42\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3-0.35\text{PbTiO}_3$ crystals, *CrystEngComm*, 2013, 15: 6292-6296.
74. Wan Y, Li Z*, Chen H, **Li F**, Xu Z, Fan S, Yao X. Variations of composition and dielectric properties of $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3-\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3-\text{PbTiO}_3$ single crystal along growth direction, *J Appl Phys*, 2013, 113(12): 124105.
75. Tang H, Zhang MF, Zhang SJ*, Feng YJ, **Li F**, Shrout TR. Investigation of dielectric and piezoelectric properties in $\text{Pb}(\text{Ni}_{1/3}\text{Nb}_{2/3})\text{O}_3-\text{PbHfO}_3-\text{PbTiO}_3$ ternary system, *J Euro Ceram Soc*, 2013, 33(13-14): 2491-2497.
76. Tang H, Zhang SJ*, Feng YJ, **Li F**, Shrout TR. Piezoelectric Property and Strain Behavior of $\text{Pb}(\text{Yb}_{0.5}\text{Nb}_{0.5})\text{O}_3-\text{PbHfO}_3-\text{PbTiO}_3$ Polycrystalline Ceramics, *J Am Ceram Soc*, 2013, 96(9): 2857-2863.
77. **Li F***, Zhang SJ, Xu Z, et al. An efficient way to enhance output strain for shear mode $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3-\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3-\text{PbTiO}_3$ crystals: Applying uniaxial stress perpendicular to polar direction, *Appl Phys Lett*, 2012, 100(4): 192901.
78. **Li F**, Zhang SJ, Li ZR, and Xu Z. Recent Development on Relaxor- PbTiO_3 Single Crystals: the Origin of High Piezoelectric Response, *Prog Phys*, 2012, 32 (4): 178-198.
79. Zhang SJ* and **Li F**. High Performance Ferroelectric Relaxor- PbTiO_3 Single Crystals: Status and Perspective, *J Appl Phys*, 2012, 111(3): 031301.
80. Gao JJ, Xu Z, **Li F**, et al. Phase transitions and electromechanical properties for barium titanate and lead titanate ferroelectric crystals under one-dimensional shock wave compression, *J Appl Phys*, 2012, 112(11): 114118.
81. **Li F**, Zhang SJ, Xu Z, et al. Critical Property in Relaxor- PbTiO_3 Single Crystals --- Shear Piezoelectric Response, *Adv Funct Mater*, 2011, 21(11): 2118-2128.
82. **Li F**, Zhang SJ*, Xu Z, et al. Electromechanical properties of $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3-\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3-\text{PbTiO}_3$ single crystals, *J Appl Phys*, 2011, 109(1):014108.
83. **Li F**, Zhang SJ, Xu Z, et al. Dc bias electric field dependent piezoelectricity for [001] poled $\text{PbIn}_{0.5}\text{Nb}_{0.5}\text{O}_3-\text{PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3-\text{PbTiO}_3$ crystals, *J Adv Dielectr*, 2011, 1(3): 303-307.
84. Zhang SJ*, **Li F**, Jiang WH, et al. Face Shear Piezoelectric properties of relaxor- PbTiO_3 single crystals, *Appl Phys Lett*, 2011, 98(18): 182903.
85. Zhang SJ*, **Li F**, Luo J, et al. Field Stability of Piezoelectric Shear Properties in PIN-PMN-PT Crystals Under Large Drive Field, *IEEE Trans Ultra Ferroelectr Freq Contr*, 2011, 58(2): 274-280.

86. Zhang SJ*, Li F, Sherlock NP, et al. Recent developments on high Curie temperature PIN-PMN-PT ferroelectric crystals, *J Cryst Growth*, 2011, 318(1): 846-850.
87. Gao JJ*, Xu Z, Li F, et al. The effect of the hydrostatic pressure on the electromechanical properties of ferroelectric rhombohedral single crystals $\text{PbIn}_{0.5}\text{Nb}_{0.5}\text{O}_3\text{-PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3\text{-PbTiO}_3$, *Appl Phys Lett*, 2011, 99(6): 062903.
88. Gao JJ*, Xu Z, Li F, et al. The hydrostatic pressure dependence of the piezoelectric properties for the barium titanate and lead titanate crystals: Thermodynamic analysis, *J Appl Phys*, 2011, 109(11): 114111.
89. Gao JJ*, Xu Z, Li F, et al. Pyroelectric Properties of Rhombohedral and Tetragonal $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{-Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{-PbTiO}_3$ Crystals, *J Appl Phys*, 2011, 110(10):106101.
90. Zhang Q, Li ZR*, Li F, et al. Structural and Dielectric Properties of $\text{Bi}(\text{Mg}_{1/2}\text{Ti}_{1/2})\text{O}_3\text{-BaTiO}_3$ Lead-Free Ceramics, *J Am Ceram Soc*, 2011, 94(12): 4335-4339.
91. Lin DB, Lee HJ, Zhang SJ*, Li F, et al. Influence of domain size on the scaling effects in $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ ferroelectric crystals, *Scripta Mater*, 2011, 64(12):114-1151.
92. Lin DB, Zhang SJ*, Li ZR, Li F, et al. Domain size engineering in tetragonal $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$, *J Appl Phys*, 2011, 110(8):084110.
93. Zhang CH, Xu Z, Gao JJ, Li F, et al. Influence of hydrostatic pressure on electric field induced phase transition of $\text{PbLa}(\text{Zr},\text{Sn},\text{Ti})\text{O}_3$ ceramic, *Mater Res Innov*, 2011, 15(4):271-273.
94. Zhang SJ*, Jiang WH, Richard J. Jr M, Li F, et al. Measurements of face shear properties in relaxor- PbTiO_3 single crystals, *J Appl Phys*, 2011, 110(6):064106.
95. Li F, Zhang SJ*, Xu Z, et al. Temperature Independent shear piezoelectric response in Relaxor-PT based Crystals, *Appl Phys Lett*, 2010, 97(25):252903.
96. Li F, Zhang SJ*, Xu Z, et al. Piezoelectric activity of relaxor- PbTiO_3 based single crystals and polycrystalline ceramics at cryogenic temperatures: Intrinsic and extrinsic contributions, *Appl Phys Lett*, 2010, 96(19):192903.
97. Li F, Zhang SJ*, Xu Z, et al. Electromechanical properties of tetragonal $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ ferroelectric crystals, *J Appl Phys*, 2010, 107(5): 054107.
98. Li F, Zhang SJ*, Xu Z, et al. Composition and phase dependence of the intrinsic and extrinsic piezoelectric activity of domain engineered $(1-x)\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-xPbTiO}_3$ crystals, *J Appl Phys*, 2010, 108(3): 034106.
99. Li F, Zhang SJ*, Xu Z, et al. Investigation of Electromechanical Properties and Related Temperature Characteristics in Domain-Engineered Tetragonal $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ Crystals, *J Am Ceram Soc*, 2010, 93(9):2731.
100. Lee HJ, Zhang SJ*, Luo J, Li F, et al. Thickness-Dependent Properties of Relaxor- PbTiO_3 Ferroelectrics for Ultrasonic Transducers, *Adv Func Mater*, 2010, 20(18): 3154-3162.
101. Zhang SJ*, Li F, Luo J, et al. Investigation of single and multidomain $\text{PbIn}_{0.5}\text{Nb}_{0.5}\text{O}_3\text{-PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3\text{-PbTiO}_3$ crystals with mm2 symmetry, *Appl Phys Lett*, 2010, 97(13):132903.
102. Zhang SJ*, Luo J, Li F, et al. Polarization fatigue in $\text{PbIn}_{0.5}\text{Nb}_{0.5}\text{O}_3\text{-PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3\text{-PbTiO}_3$ single crystals, *Acta Mater*, 2010, 58(10): 3773-3780.
103. Lin DB, Li ZR*, Li F, et al. Characterization and piezoelectric thermal stability of PIN-PMN-PT ternary ceramics near the morphotropic phase boundary, *J Alloy Comp*, 2010, 489(1): 115-118.
104. Zhang Q, Li ZR*, Li F, et al. Temperature Dependence of Dielectric/Piezoelectric

Properties of $(1-x)\text{Bi}(\text{Mg}_{1/2}\text{Ti}_{1/2})\text{O}_3\text{-}x\text{PbTiO}_3$ Ceramics with an MPB Composition, *J Am Ceram Soc*, 2010, 93, 3330-3334.

105. Wang XA*, Xu Z, Li ZR, and Li F. Growth of the Relaxor Based Ferroelectric Single Crystals $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ by Vertical Bridgman Technique, *Ferroelectrics*, 2010, 401:173-180.
106. Wang LH*, Xu Z, Li ZR, and Li F. Investigation on the Thermal Stability of $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ Single Crystals, *Ferroelectrics*, 2010, 402:187-192.
107. Wang LH*, Xu Z, Li ZR, and Li F. Bridgman growth and thermal analysis of $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ single crystals, *Mater Sci Eng B*, 2010, 170(1):113-116.
108. Yu FP, Zhao X, Pan L, Li F, et al. Investigation of zero temperature compensated cuts in langasite-type piezocrystals for high temperature applications, *J Phys D: Appl Phys*, 2010, 43(16):165402.
109. Zhang CH, Xu Z, Gao JJ, Li F, et al. Dielectric properties of [001]-oriented $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ single crystal under hydrostatic pressure, *High Pressure Res*, 2010, 30(2): 273-279.
110. Li F*, Xu Z, Wei ZY, et al. Determination of temperature dependence of piezoelectric coefficients matrix of lead zirconate titanate ceramics by quasi-static and resonance method, *J Phys D: Appl Phys*, 2009, 42(9): 095417.
111. Li F*, Xu Z, Wei XY, et al. Evolution of transverse piezoelectric response of lead zirconate titanate ceramics under hydrostatic pressure, *J Phys D: Appl Phys*, 2009, 42(7): 072001.
112. Li F*, Jin L, Xu Z, et al. Determination of three-dimensional orientations of ferroelectric single crystals by an improved rotating orientation x-ray diffraction method, *Rev Sci Instrum*, 2009, 80(8): 085106.
113. Li F*, Xu Z, Wei XY, et al. Temperature and dc bias field dependence of the piezoelectric effect in soft and hard lead zirconate titanate ceramics, *J Electroceram*, 2009, 24(4):294-299.
114. Guo ZQ, Jin L, Li F et al. Applications of the rotating orientation XRD method to oriented materials, *J Phys D: Appl Phys*, 2009, 42(1): 012001.
115. Li F*, Xu Z, Wei XY, et al. Domain switching contribution to piezoelectric response in BaTiO_3 single crystals, *Appl Phys Lett*, 2008, 93(19): 192904.

Patents

1. Li F, Lin D, Zhang S, ShROUT TR, Chen LQ. Perovskite relaxor- PbTiO_3 based ferroelectric ceramics with ultrahigh dielectric and piezoelectric properties through polar nanoregions engineering: U.S. Patent 10,811,593. 2020-10-20.
2. Li F, Qiu C, Zhuo X, Zhang S, ShROUT TR, and Chen LQ. "Piezoelectric single crystal with near-perfect transparency and high piezoelectricity, preparation method and application thereof", US Patent application No. US16/541,309, Aug 15th, 2019.
3. Li F, Zhang SJ, Li ZR, and Xu Z, "A method to obtain single domain relaxor-PT crystals", CN103266354A, Aug. 28th, 2016.
4. Hackenberger W, Luo J, Zhang SJ, Li F, ShROUT TR, Snook KA, Sahul R, "Temperature and field stable relaxor-PT piezoelectric single crystals," US2015/0076391A1, March 19th, 2015.
5. Li F, Lin D, Zhang S, ShROUT TR, Chen LQ. "Perovskite relaxor- PbTiO_3 based ferroelectric ceramics with ultrahigh dielectric and piezoelectric properties through polar nanoregions engineering". WIPO Patent No. 2018187316, Oct 12th, 2018.

6. Luo, J., Hackenberger, W. S., **Li, F.**, Zhang, S., & ShROUT, T. R. U.S. Patent No. 16/119,666, March 7th, 2019.

Scholarly book chapters

1. Zhang S.J., **Li F** and Yu F. “Piezoelectric materials for cryogenic and high-temperature applications”, Chapter in *Structural Health Monitoring (SHM) in Aerospace Structures*, Edited by Fuh-Gwo Yuan, Woodhead Publishing, 2016.