

Curriculum Vitae

Professor Dr. Haydn H.D. Chen

程海東

Education

Degrees	Field	Institution
Ph.D.	Materials Science & Engineering	Northwestern University
M.S.	Physics	Northwestern University
B.S.	Physics	Tsing-Hua Univ. Taiwan

Experience

➤ National Yang Ming Chiao Tung University (NYCU, Hsinchu, Taiwan):

- Chief Strategy Officer Feb. 2021 to present
- Honorary Chair Professor Feb. 2023 to Present
- Professor of International College of Semiconductor Technology Aug. 2017 to Feb. 2023
- Chair Professor of Materials Science & Engineering (Joint Affiliation) Aug. 2014 to Feb. 2023

➤ University of Macau (UM, Macau SAR):

- Emeritus Professor, Institute of Applied Physics & Materials Eng. Aug. 2017 to present
- Vice Rector (Student Affairs) Sept. 2012 to Aug. 2017
- Chair Professor of Physics and Materials Science Sept. 2012 to Aug. 2017

➤ Tunghai University (THU, Taichung, Taiwan):

- Honorary Professor, International College Aug. 2017 to present
- President, Tunghai University Aug. 2004 to Jul. 2012
- Professor, Department of Physics, Tunghai University Aug. 2004 to Jul. 2012

➤ **City University of Hong Kong (CityU, Hong Kong SAR):**

- Head, Department of Physics & Materials Science May 2000 to Jul. 2004
- Chair Professor of Materials Science May 2000 to Jul. 2004

➤ **University of Illinois at Urbana-Champaign (UIUC, USA)**

- Emeritus Professor, Materials Science & Engineering Jan. 2001 to present
- Adjunct Professor, Materials Science & Engineering Jul. 2003 to July 2004
- Admin Fellow, Office of the Vice President for Academic Affairs Aug. 1999 to July 2000
- Professor of Materials Science & Engineering Aug. 1987 to Dec. 2001
- Principal Investigator, Fredrick Seitz Materials Research Laboratory Aug. 1978 to Dec. 2001
- Director, UNICAT (Synchrotron X-ray Program) Jan. 1991 to Aug. 2001
- Chairman, Metallurgy Division Oct. 1995 to Jan. 2000
- Associate Professor, Metallurgical Engineering Aug. 1982 to Aug. 1987
- Assistant Professor, Metallurgical Engineering July 1978 to Aug. 1982

➤ **Other Related Professional Experiences**

- Freelance Expert writer in LinkedIn and for the Office for Promotion and International Outreach at NYCU, current.
- Research Fellow, MPI-Metallforschung, Stuttgart, Germany, June-July, 1999
- Fellow, Japanese Society for Promotion of Science (JSPS), University of Tsukuba, Japan, Dec. 3, 1995 to Jan. 31, 1996
- Scientist-in-Residence, Argonne National Laboratory, Argonne, IL, Jan.1 to June 30, 1993
- Fellow, International Exchange Program. University of Tsukuba, Tsukuba, Japan, summer 1989
- Research Fellow, Intense Pulsed Neutron Source, Argonne National Laboratory, summer 1987
- Visiting Scientist, Materials Research Laboratories, Industrial Technology Research Institute, Taiwan, R.O.C., from Jan. 1 to May 31, 1985
- Visiting Professor, National Tsing-Hua University, Taiwan, from Jan. 1 to May 31, 1985
- Research Associate, Alloy Properties Group, Materials Science Division, Argonne National Laboratory, Argonne, Illinois, from March 1, 1977 to July 16, 1978
- Research Assistant, Dept. of Materials Science & Engineering, Northwestern University, Evanston, Illinois, from July 1972 to March 1977
- Department Fellow and Teaching Assistant, Dept. of Physics, Northwestern University, Evanston, Illinois, from Sept. 1971 to June 1972

Honors, Awards and Recognition

- Listed in Who's Who in the ROC, Government Information Office, Taiwan (2009)
- Fellow of MRS-T (Materials Research Society – Taiwan)
- Man of the Year – 2007, American Biographical Institute, Inc., U. S. A.
- Listed in the Asia/Pacific Who's Who, Rifacimento International, India (2007)
- Outstanding Scientist of the 21st Century, International Biographical Centre, Cambridge, England (2007)
- International Educator of the Year 2007, International Biographical Centre, Cambridge, England
- Hou Chin Tui Award, Hou Chin Tui Foundation, Taiwan (2006)
- 26th Lu Tze Hung Memorial Award, The Chinese Society for Materials Science, Taiwan (2006)
- Outstanding Scholar Award, Foundation for the Advancement of Outstanding Scholarship, Taiwan (2005)
- Distinguished Alumni Award, College of Science at National Tsing Hua University, Taiwan (2005)
- Honorary Member of the Phi Tau Phi Scholastic Honor Society of the Republic of China (2004)
- Humboldt Research Award (Germany Alexander von Humboldt Foundation)
- Fellow of ASM-International (FASM)
- Fellow of JSPS (Japan Society for Promotion of Science) (FJSPS)
- Fellow of Hong Kong Institution of Engineers (FHKIE)
- Consultant Professor, South China University of Science & Technology (9/2002-present)
- MACRONIX Honorary Lecturer, National Chiao Tung University, Taiwan (2001)
- Member, New York Academy of Sciences (MNYAS)
- Member of Honor Societies Sigma Xi and Alpha Sigma Mu
- Principal Editor, Materials Chemistry and Physics (1997-2006)
- Member, Research Board of Advisors, American Biographical Institute, Inc. (2000-2002)
- List of Excellent Teachers in 1988, 1989, 1994, 1997 - selected by students at UIUC
- 1989 Anderson Excellent Advisor of the College of Engineering at UIUC
- Distinguished International Exchange Fellow of the University of Tsukuba, Japan (1989)
- Honorable Chair Lecturer, National Science Council, Taiwan (1991, 1999 and 2001)
- Listed in American Men & Women of Science
- Listed in Who's Who in American Education
- Listed in Who's Who in Science and Engineering

Professional Activities and Society Leadership Roles

- Fellow of Hong Kong Institution of Engineers, HKIE
- Fellow of ASM-International (ASM)
- Chair (2000 – 2004), Chair-Elect (1998 - 2000) and an Executive Member (1989 – 1998) of the ASM Materials Science
- Critical Technology Sector (ASM-MSCTS) Council
- Member of Technical Programming Board of ASM-International (since August 2000)
- Council member (since December 2001) and Executive Committee member (since December 2002) of Hong Kong Institution of Science (HKIS)
- Chairman of the Structures Committee of ASM-MSCTS (1994 -1997)
- Chairman of the Phase Transformation Committee of ASM-MSCTS (1989 -1992).
- Chairman of ASM Sangamon Valley Chapter (1983-84)
- Member of the Metallurgical Society (TMS) of AIME
- Member of Material Research Society (MRS)
- Member of American Physical Society (APS)
- Member of American Ceramic Society (ACerS)
- Member of American Crystallographic Association (ACA) (until 1998)
- Appointed Member of the USA Delegation to the First Argentina-USA Bilateral Symposium on Materials Science and Engineering, Buenos Aires, Argentina, Nov. 1995.
- Appointed Member of the Program Advisory Committee for IPNS of Argonne National Laboratory and LANSCE of Los Alamos National Laboratory (1987-90).
- Appointed Member of the Advisory Board for the Argonne National Laboratory –Materials Science Division Synchrotron
- Radiation Program (1991-1993).
- Elected Member of the Advanced Photon Source Users Organization (APSUO) Steering Committee (1990-1992).
- Elected Member of the Small-Angle Scattering Special Interest Group of the American Crystallographic Association (ACA) (1988-90).
- Key Reader for Metallurgical & Materials Transactions (1992 - 2000)
- Principal Editor (Aug. 1997-present), previously a member on the Advisory Board (1992-97), of Materials Chemistry & Physics
- Editor, Materials Transactions, Journal by Japanese Institute of Metals (2001 – 2012)
- Member of the International Editorial Committee, Journal of Korean Ceramic Society (Feb. 2002- 2012)
- Member of the Editorial Board, Journal of Functional Materials (Feb. 2014- 08/2017)
- Expert commissioned by the Russian Science Foundation (Feb. 2015 – Present)

Professional Services at the University of Macau and China Region

- Member, Editorial Board, Journal of Functional Materials (2013-2016)
- Member, General Education Committee (09/2013 – 08/2017)
- Member, General Affairs Committee (09/2013 – 08/2017)
- Vice President of Chinese University Basketball Association (CUBA) (05/2013 – 08/2017)
- Chair, Panel for the UM Symbol Design and Slogan Design Contest (04/2013 – 05/2013)
- Chair, Naming Workgroup (02/2013 – 2014)
- Member, UMDF Executive Committee (01/2013 – 08/2017)
- Member, Selection Committee for Recruitment of Residential College Associate Masters (11/2012 – 08/2017)
- Chair, UM Campus Relocation Student Affairs Sub-Command Centre (11/2012 – 2013)
- Member, UM New Campus Project War Room Meeting (10/2012 – 08/2014)
- Chair, Advisory Committee on Residential College System (10/2012 – 08/2017)
- Chair, Selection Committee for the Recruitment of Director of Office of Sports Affairs (09/2012 – 12/2012)
- Member, Selection Committee for Recruitment of Residential College Masters (09/2012 – 08/2017)
- Chair, Student Affairs Executive Committee (09/2012 – 08/2017)
- Member, Academic Council of Faculty of Science and Technology (09/2012 – 08/2017)
- Member, University Affairs Coordination Committee (09/2012 – 08/2017)
- Member, Senate (09/2012 – 08/2017)
- Member, Finance Management Committee (09/2012 – 08/2017)
- Member, University Council (09/2012 – 08/2017)
- Member, University Assembly (09/2012 – 08/2017)

Professional Services in Taiwan

- Special Advisor, WIN Semiconductor Company (2020-present)
- Chair Professor, National Yang Ming Chiao Tung University (08/2014 – present)
- Member, Board of Trustees, Tamkang University, (08/2014 – 07/2018)
- Trustee, Board of National Synchrotron Radiation Research Center (NSRRC), Taiwan (03/2006 – 07/2012)
- Board Member, Taiwan Association for Coating and Thin Film Technology (01/2006 – 2012)
- Advisor, Taichung City Government (01/2006 – 2014)

- Board Member, The Association of General Education, Taiwan (01/2006 – 07/2012)
- Chairman (since Sept. 2009) and member of the Board, Association of Private Universities and Colleges (08/2004 – 07/2012)
- Trustee, The Foundation for International Cooperation Aug. 2004 to present in Higher Education in Taiwan (FICHET) (08/2004 – 07/2012)
- Board Member, College Entrance Examination Center (08/2004 – 07/2012)
- Member, UAC (08/2004 – 07/2012)
- Member, Managing Committee, Joint Committee of College Admission Practical Examinations (CAPE) (08/2004 – 07/2012)
- Director, General Scholastic Aptitude Test (GSAT) for Taichung Area, College Entrance Examination Center (08/2004 – 07/2012)
- Trustee, Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT) (03/2009 – 07/2012)
- Member, Academic Review Committee for Mainland Chinese Students Studying in Taiwan, Ministry of Education (01/2011 – 12/2012)
- Member, Steering Committee, Presidents' Forum of Southeast and South Asia and Taiwan Universities (SATU Presidents' Forum), National Cheng Kung University (01/2011 – 12/2012)
- Chief Advisor, Taichung City Chamber of Commerce (08/2009 – 08/2012)
- Board Member, National Synchrotron Radiation Research Center (NSRRC) (03/2009 – 02/2012)
- Executive Director, National Collegiate Art Center Association (01/2009 – 12/2011)
- Member, Advisory Committee, International Association of University Presidents (IAUP) Northeast Asia Conference (30/09 – 02/10/2009)
- District Superintendent, General Scholastic Aptitude Test for Taichung Second Division, College Entrance Examination Center (08/2007 – 07/2008)
- Member, Board of Trustees, Foundation for the Promotion of Reading Culture in Taiwan (08/2006 – 08/2009)
- Taiwan Representative, Executive Committee, Association of Christian Universities and Colleges in Asia (ACUCA) (2006 – 2010)
- Member, Taichung Advisory Committee, China Youth Corps (07/2006 – 06/2007)
- Member, Taichung American Corner Advisory Board (03/2006 – 05/2007)
- Chairman, Organizing Committee, Taiwan Christian Universities and Colleges Alliance (TaiCUCA) (01/2006 – 08/2008)

Professional Services at the City University of Hong Kong

- Ex-officio Member, Senate (6/2000 – 7/2004)
- Elected Member, Academic Policy Committee (APC) (9/2001 – 7/2004)
- Chair, APC Sub-Committee on Undergraduate Admission (1/2003 – 7/2004)
- Member, Sub-Committee on Staff Development and Evaluation, Management Board, (4/2003 – 7/04)
- Member, University Press Committee, CityU (6/2001 – 7/2004)
- Member, Faculty Staffing Committee, Faculty of Science and Engineering, CityU (8/2000 – 7/04)
- Member, Physical Sciences Panel, Research Grants Council (RGC) of Hong Kong (8/2000 – 7/04)
- Elected Member and Deputy Chairman, HKIE Materials Division Committee (2001 – 7/04)
- Council Member, Hong Kong Institution of Science (HKIS) (11/2001 – 7/04)
- Member, Special Committee for Re-appointment of Dean (FSE), CityU (2000-01)
- Member, Search Committee for Dean of School of Business, CityU (2000-01)
- Panel Chair, Sir Edward Youde Memorial Fellowship (2000)
- External Examiner, Hong Kong Polytechnic University (2001, 2002)

Services at the University of Illinois at Urbana-Champaign (UIUC)

- Administrative Fellow, Office of the Vice President for Academic Affairs (1999 - 2000)
- Member, Search Committee, Ralph E. Grim Endowed Professorship in Geology (1999-2000)
- Chairman of the Senate Committee on Campus Operations (1998 – 2000)
- Member of the University of Illinois Senate Council (1998-2000)
- Member of the University of Illinois Senate (1987-1993, 1994-1996 and 1997-2000)
- Member of General University Policies Committee of the UIUC Senate (1994-1996).
- Member of the Honorary Doctor Degrees Committee of the UIUC Senate (1991-1993).
- Member of Department's Advisory Committee (1995 - 2000)
- Member of Department's Promotion (Development) Committee (1996 - 2000)
- Chairman, Department's Faculty Search Committee (1995 - 1998) and a member (1998-2000)
- Chairman, Department's Graduate Affairs Committee (1993 - 1996)
- Chairman, Department's Teaching Evaluation Committee (1990 - 1992)
- Chairman, Met. & Min. Department's Graduate Recruitment Committee (1984 - 1987)
- Chairman, Met. & Min. Department's Undergraduate Curriculum Committee (1982-84)

- Served in Engineering College for: Teaching Evaluation and Improvement Committee, Library Committee, Liaison with
- EEO (Affirmative Action) Officer, College of Engineering (1998 – 1999)

Technical Research Interests

- Nano-Science and Technology
- Phase Transformations
- Metals and Alloys
- Electrical ceramics
- Synchrotron X-ray Instrumentation and Research

Technical Research Specialties

Prof. Haydn Chen has dedicated his research to understanding the physical mechanisms and structure-property relationships in various material systems, including metals/alloys, electrical ceramics, semiconductors, hard coatings, surfaces, and thin films. His group has contributed to materials processing and the development of synchrotron x-ray beamlines for materials science applications at the Advanced Photon Source. Prof. Chen has published over 300 refereed articles and book chapters and has given more than 300 invited lectures and seminars. He has supervised 16 Master's and 24 Doctoral graduates at the University of Illinois at Urbana-Champaign, City University of Hong Kong, and the University of Macau. His research focused on novel methods for modifying and utilizing materials for industrial and biomedical applications. Some significant accomplishments in two specific research areas are detailed in the following sections.

➤ *Electrical Ceramics*

- Chen and his co-workers reported for the first time the temperature dependence of superlattice reflections in PMN single crystals using synchrotron x-ray diffuse scattering techniques [Ferroelectrics 253, 1 (2001)].
- Using MOCVD method, Chen's group succeeded in growing the $\text{Pb}(\text{Sc}, \text{Ta}, \text{Ti})\text{O}_3$ (PSTT) relaxor ferroelectric films for the first time ever. They were able to grow the thinnest PZT films with good dielectric properties [Appl. Phys. Lett. 75, 2485 (1999), J. Appl. Phys. 88, 2157 (2000), J. Appl. Phys. 90, 1509 (2001)].
- Using high-resolution Z-contrast imaging, Chen's group reported the first direct observation of local ordering in undoped and La-doped $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ on an atomic scale and contributed to a

better understanding of structure-property relationship in relaxor ferroelectrics [J. Am. Ceram. Soc. 83, 181 (2000)].

- Using sol-gel techniques, Chen and his colleagues have been very successful in growing high quality antiferroelectric thin films of PZ and PNZST with best electrical characteristics reported thus far [J. Appl. Phys. 92, 3990 (2002), Appl. Phys. Lett. 81, 3621 (2002)].
- Transparent conducting oxide (TCO) and hard optical coatings were prepared using MOCVD. Chen's group developed a good quality TCO using Ta-doped SnO₂, which showed resistivity near 1×10^{-4} ohm-cm and transparency near 90% in the visible light spectrum [Thin Solid Films 405, 256 (2002)].
- Dense, high refraction index and reproducible Sc₂O₃ thin films with high mechanical strength were grown by MOCVD. This is a promising material for laser optical coatings and for anti-reflective coatings [Appl. Phys. Lett. 79, 3782 (2001)].
- A comprehensive review article on the Progress in high-strain perovskite piezoelectric ceramics, co-authored with Jigong Hao, Wei Li, Jiwei Zhai [Materials Science & Engineering R, 135, pp. 1-57 (2019)].

➤ ***X-ray Diffraction Methods and Applications***

- Chen has been the Director of UNICAT (University – National Laboratory – Industry Collaborative Access Team) in USA, an organization responsible for the state-of-the-art instrumentation at the Advanced Photon Source of Argonne National Laboratory. He and co-workers have developed a simple and useful tool for the study of phonon dispersion relationship using essentially the monochromatic beam transmission Laue method, with high x-ray energy and a CCD area detector [Phys. Rev. Lett. 83, 3317 (1999)].
- Chen's group has employed many x-ray diffraction based approaches to improve our understanding of the nature of the relaxor structure on the atomistic level [Phys. Rev. Lett. 82, 3709 (1999)].
- With the use of high brilliance synchrotron x-ray sources, we developed a method we coined RSXD – Reflection Surface X-ray Diffraction. RSXD is a technique that produces x-ray diffraction patterns from surfaces and interfaces in reflection geometry and provides straightforward analysis, high resolution, and penetration to reach buried interfaces [Rev. Sci. Instrum. 73, 1720 (2002)].
- Chen's group developed a new experimental method to measure residual stresses in textured thin film coatings using grazing-incidence x-ray diffraction geometry [Thin Solid Films, 418, 73 (2002)].

Highlighted Accomplishments in Electrical Ceramics

➤ Phase Transformations

- Linear Chain Structure in Cubic KNbO₃ and BaTiO₃
M. Holma, N. Takesue and Haydn Chen, *Ferroelectrics*, 164, 237-251 (1995).
- Anomalous X-ray Scattering Study of Chemical & Polar Nanodomains in Pb(Mg_{1/3}Nb_{2/3})O₃ Single Crystal
Andrei Tkachuk and Haydn Chen, *Ferroelectrics*, 253, 1-9 (2001).
- Synchrotron X-ray Studies of Supperlattice Ordering in Pb(Mg_{1/3}Nb_{2/3})O₃ Single Crystal Doped with PbTiO₃
A. Tkachuk, P. Zschack, E. Colla and H. Chen, in *FUNDAMENTAL PHYSICS OF FERROELECTRICS 2001: 11th Williamsburg Ferroelectrics Workshop*, AIP Series 582, 45-54 (2001).
- Anti-ferrodistortive Nanodomains in PMN Relaxor
A. Tkachuk and Haydn Chen, *American Institute of Physics (AIP) Conference Proceedings No 677*, 55-64 (2003)
- Griffiths-like Behavior of a Disordered Antiferroelectric
E.V. Colla, M.B. Weissman, W.H. Chan and Haydn Chen, *Phys. Rev. B* 69, 180101-1-180101-4 (2004)
- Phase evolution and electrical properties of copper-electroded BaTi₄O₉ materials with BaO–ZnO–B₂O₃–SiO₂ glass system in reducing atmosphere
Kuei-Chih Feng, Chen-Chia Chou, Cheng-Sao Chen, Li-Wen Chu and Haydn Chen, *Ceramics International*, 39(1), S321–S324 (2013)
- Condensation of the atomic relaxation vibrations in lead-magnesium-niobate at $T = T^*$
Sergey Prosdandeev, Igor P. Raevski, Maria A. Malitskaya, Svetlana I. Raevskaya, Haydn Chen, Chen-Chia Chou, and Brahim Dkhil, *Journal of Applied Physics*, 114 (12), 124103 (2013).
- Phase transitional behavior and electric field-induced large strain in alkali niobate-modified Bi_{0.5}(Na_{0.80}K_{0.20})_{0.5}TiO₃ lead-free piezoceramics
Jigong Hao, Bo Shen, Jiwei Zhai, and Haydn Chen, *Journal of Applied Physics*, 115(3), 034101 (2014).
- Studies of ferroelectric and magnetic phase transitions in multiferroic PbFe_{0.5}Ta_{0.5}O₃–PbTiO₃ solid solution ceramics
I. P. Raevski, V. V. Titov, M. A. Malitskaya, E. V. Eremin, S. P. Kubrin, A. V. Blazhevich, H. Chen, C.-C. Chou, S. I. Raevskaya, I. N. Zakharchenko, D. A. Sarychev, S. I. Shevtsova, *Journal of Materials Science*, 49(18), 6459–6466 (2014).

- Effect of BiMeO₃ on the Phase Structure, Ferroelectric Stability, and Properties of Lead-Free Bi_{0.5}(Na_{0.8}OK_{0.20})_{0.5}TiO₃ Ceramics
Jigong Hao, Bo Shen, Jiwei Zhai, Haydn Chen, *Journal of the American Ceramic Society*, 97(6), 1776–1784 (2014).
- Phase Diagrams and Electromechanical Strains in Lead-Free BNT-Based Ternary Perovskite Compounds
Wangfeng Bai, Lingyu Li, Wei Li, Bo Shen, Jiwei Zhai, Haydn Chen, *Journal of the American Ceramic Society*, 97(11), 3510–3518 (2014)
- Studies of ferroelectric and magnetic phase transitions in multiferroic PbFe_{0.5}B_{0.5}O₃–PbTiO₃ (B–Nb, Ta) solid solution ceramics
I. P. Raevski, S. P. Kubrin, A. V. Blazhevich, M. S. Molokeev, S. V. Misjul, E. V. Eremin, H. Chen, C. C. Chou, E. I. Sitalo, S. I. Raevskaya, V. V. Titov, D. A. Sarychev, M. A. Malitskaya, I. N. Zakharchenko, , in *Advanced Materials: Physics, Mechanics and Applications (Springer Proceedings in Physics, Vol. 152)*, Springer International Publishing, 109-120 (2014).
- Influence of epitaxial strain on clustering of iron in Pb(Fe_{1/2}Nb_{1/2})O₃ thin films
S. A. Prosandeev, I. P. Raevski, S. I. Raevskaya, and H. Chen, *Physical Review B*, Volume 92, 220419(R) (2015).
- A novel phase-controlling-sintering route for improvement of diopside-based microwave dielectric materials
Kuei-Chih Feng, Chen-Chia Chou, Chung-Ya Tsao, Li-Wen Chu, Igor P. Raevski, Haydn Chen, *Ceramics International*, Volume 41, S526–S529 (2015).

➤ **Ferroelectric and Antiferroelectric Thin Films**

- Dielectric Properties of Metal-Organic Chemical Vapor Deposited Highly Textured Pb(ScTa)_{1-x}Ti_xO₃ Relaxor Ferroelectric Thin Films on LaNiO₃ Electrode Buffered Si
C.H. Lin, S.W. Lee, Haydn Chen and T.B. Wu, *Appl. Phys. Lett.* 75(16), 2485-2487 (1999).
- Electrical Characteristics of 25 nm Pb(ZrTi)O₃ Thin Films Grown on Si by Metal-Organic Chemical Vapor Deposition
C.H. Lin, P.A. Friddle, X. Lu, Haydn Chen, Y Kim, and T.B. Wu, *J. Appl. Phys.* 88(4) 2157-2159 (2000).
- Effects of Thickness on the Electrical Properties of Metal-Organic Chemical Vapor Deposited Pb(Zr,Ti)O₃ (25 nm–100 nm) Thin Films on LaNiO₃ Buffered Si
C.H. Lin, P.A. Friddle, C.H. Ma, A. Daga and Haydn Chen, *J. Appl. Phys.* 90(3) 1509-1515 (2001).
- Dielectric and Ferroelectric Properties of Highly Oriented (Pb, Nb)(Zr, Sn, Ti)O₃ Thin Films Grown by a Sol-Gel Process

Zhai Jiwei, M.H Cheung, Zheng Kui Xu, Xin Li, and Haydn Chen, Eugene V. Colla, T.B. Wu, *Appl. Phys. Lett.* 81(19), 3621-3623 (2002).

- Non-linear Behaviors of the Compositionally Graded (Ba,Sr)TiO₃ Thin Films Derived by a Sol-Gel Process
Jiwei Zhai and Haydn Chen, *Appl. Phys. Lett.* 84(7), 1162-1164 (2004).
- Relaxor and Non-linear Behaviors of SrTiO₃/BaTiO₃ Multilayers Derived by a Sol-Gel Process
Jiwei Zhai, T.F. Hung and Haydn Chen, *Appl. Phys. Lett.* 85(11), 2026-2028 (2004).
- (Pb,La)(Zr,Sn,Ti)O₃ antiferroelectric thin films grown on LaNiO₃-buffered and Pt-buffered silicon substrates by sol-gel processing
Li Xin, Jiwei Zhai, Haydn Chen, *J. Appl. Phys.*, 97, 024102 (2005).
- The ferroelectricity properties of PbxSr_{1-x}TiO₃ and its compositionally graded thin films grown on the highly oriented LaNiO₃ buffered Pt/Ti/SiO₂/Si substrates
Jiwei Zhai, Xi Yao, Zhengkui Xu, and Haydn Chen, *J. of App. Phys.* 100, 024108 (2006).
- Effects of CaTiO₃ addition on microstructures and electrical properties of Na_{0.52}K_{0.48}NbO₃ lead-free piezoelectric ceramics
Cheng-Sao Chen, Chen-Chia Chou, Yung-Shun Lin, Pin-Yi Chen, Haydn Chen, *Ceramics International*, 39, S125–S128 (2013).
- The effects of aliovalent cations doping on electric-field-induced strain and microstructures of (Bi_{0.5}Na_{0.5})_{0.94}Ba_{0.06}TiO₃ lead-free piezoceramics
Pin-Yi Chen, Chen-Chia Chou, Cheng Nan Chen, Cheng-Sao Chen, Haydn Chen, *Ceramics International*, 39, S129–S133 (2013).
- Effect of SrTiO₃ template on electric properties of textured BNT–BKT ceramics prepared by templated grain growth process
Wangfeng Bai, Lingyu Li, Wei Li, Bo Shen, Jiwei Zhai, Haydn Chen, *Journal of Alloys and Compounds*, 603, 149–157 (2014).
- A. A. Gusev, I. P. Raevski, E. G. Avvakumov, V. P. Isupov, S. P. Kubrin, H. Chen, C.C. Chou, D. A. Sarychev, V. V. Titov, A. M. Pugachev, S. I. Raevskaya, V. V. Stashenko, “The effect of mechanical activation on the synthesis and properties of multiferroic lead iron niobate”, in Advanced Materials: Physics, Mechanics and Applications (Springer Proceedings in Physics, Vol. 152), Springer International Publishing, 15-26 (2014).
- Bias field effect on the dielectric and pyroelectric response of Pb(Fe_{0.5}Ta_{0.5})O₃ relaxor multiferroic ceramics
S. I. Raevskaya, V. V. Titov, I. P. Raevski, A. G. Lutokhin, Yu. N. Zakharov, V. Yu. Shonov, A. V. Blazhevich, E. I. Sitalo,

H. Chen, C.-C. Chou, S. A. Kovrigina, M. A. Malitskaya, *Ferroelectrics*, Volume 475, Issue 1, 31–40 (2015).

- Reduced leakage current, enhanced ferroelectric and dielectric properties of (La, Fe)-codoped Bi_{0.5}Na_{0.5}TiO₃-based thin films
Peng Li, Wei Li, Shaohui Liu, Yang Zhang, Jiwei Zhai, Haydn Chen, *Ceramics International*, Volume 41, S344–S348 (2015).

➤ **Hard Nitride and Optical Coatings**

- Microstructural Evolution and Electrical Property of Ta-doped SnO₂ Thin Films Grown on Al₂O₃(0001) by Metalorganic Chemical Vapor Deposition
Y.-W. Kim, Sang W. Lee and Haydn Chen, *Thin Solid Films* 405, 256-262 (2002).
- Microstructure and Optical Properties of Sc₂O₃ Thin Films Prepared by Metal Organic Chemical Vapor Deposition
Z. Xu, A. Daga and Haydn Chen, *Appl. Phys. Lett.* 79(23), 3782-3784 (2001).
- Texture Evolution of Transition-Metal Nitride Thin Films by IBAD
C.H. Ma, J.H. Huang, and Haydn Chen, *Thin Solid Films*, 446, 184-193 (2004).
- Nanohardness on Nanocrystalline Transition-Metal Nitride Thin Films
C.H. Ma, J.H. Huang and Haydn Chen, *Surface and Coating Technology* 200(12-13), 3868-3875 (2006)
- Effect of Ti Interlayer on the Residual Stress and Texture Development of TiN Thin Films
J.-H. Huang, C.H. Ma and Haydn Chen, *Surface & Coating Tech.* 200, 5937-5945 (2006).
- Evaluation of fracture toughness of ZrN hard coatings by internal energy induced cracking method
Jia-Hong Huang, Yu-Hsiang Chen, An-Ni Wang, Ge-Ping Yu, Haydn Chen, *Surface and Coatings Technology*, 258, 211–218 (2014).
- Residual stress measurement on TiN thin films by combining nanoindentation and average X-ray strain (AXS) method
An-Ni Wang, Jia-Hong Huang, Haw-Wen Hsiao, Ge-Ping Yu, Haydn Chen, *Surface and Coatings Technology*, Volume 280, 43–49 (2015).

Highlighted Accomplishments in X-ray Diffraction Methods and Applications

- A Comparison of Experiment and the Theory of Continuous Ordering
Haydn Chen and J. B. Cohen, *J. de Physique*, C-7, 314-327 (1977).
- The Development of a Laboratory EXAFS Facility

- G. S. Knapp, Haydn Chen and T. E. Klippert, *Rev. Sci. Instrum.* 49(12), 44-56 (1978).
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