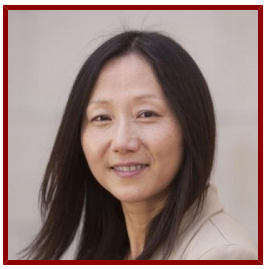
Stanford



Zhenan Bao

K. K. Lee Professor in the School of Engineering, Senior Fellow at the Precourt Institute for Energy and Professor, by courtesy, of Materials Science and Engineering and of Chemistry

Chemical Engineering

Curriculum Vitae available Online

CONTACT INFORMATION

- **Administrative Contact**

  Genniame Felix

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Bio

BIO

Zhenan Bao joined Stanford University in 2004. She is currently a K.K. Lee Professor in Chemical Engineering, and with courtesy appointments in Chemistry and Material Science and Engineering. She is a member of the National Academy of Engineering and National Academy of Inventors. She founded the Stanford Wearable Electronics Initiative (eWEAR) and is the current faculty director. She is also an affiliated faculty member of Precourt Institute, Woods Institute, ChEM-H and Bio-X. Professor Bao received her Ph.D. degree in Chemistry from The University of Chicago in 1995 and joined the Materials Research Department of Bell Labs, Lucent Technologies. She became a Distinguished Member of Technical Staff in 2001. Professor Bao currently has more than 400 refereed publications and more than 60 US patents. She served as a member of Executive Board of Directors for the Materials Research Society and Executive Committee Member for the Polymer Materials Science and Engineering division of the American Chemical Society. She was an Associate Editor for the Royal Society of Chemistry journal Chemical Science, Polymer Reviews and Synthetic Metals. She serves on the international advisory board for Advanced Materials, Advanced Energy Materials, ACS Nano, Accounts of Chemical Reviews, Advanced Functional Materials, Chemistry of Materials, Chemical Communications, Journal of American Chemical Society, Nature Asian Materials, Materials Horizon and Materials Today. She is one of the Founders and currently sits on the Board of Directors of C3 Nano Co. and PyrAmes, bot are silicon valley venture funded companies. She is Fellow of AAAS, ACS, MRS, SPIE, ACS POLY and ACS PMSE. She was a recipient of the L'Oreal UNESCO Women in Science Award in 2017. She was awarded the ACS Applied Polymer Science Award in 2017, ACS Creative Polymer Chemistry Award in 2013 ACS Cope Scholar Award in 2011, and was selected by Phoenix TV, China as 2010 Most influential Chinese in the World-Science and Technology Category. She is a recipient of the Royal Society of Chemistry Beilby Medal and Prize in 2009, IUPAC Creativity in Applied Polymer Science Prize in 2008, American Chemical Society Team Innovation Award 2001, R&D 100 Award, and R&D Magazine Editors Choice Best of the Best new technology for 2001. She has been selected in 2002 by the American Chemical Society Women Chemists Committee as one of the twelve Outstanding Young Woman Scientist who is expected to make a substantial impact in chemistry during this century. She is also selected by MIT Technology Review magazine in 2003 as one of the top 100 young innovators for this century. She has been selected as one of the recipients of Stanford Terman Fellow and has been appointed as the Robert Noyce Faculty Scholar, Finmeccanica Faculty Scholar and David Filo and Jerry Yang Faculty Scholar.

ACADEMIC APPOINTMENTS

- Professor, Chemical Engineering
- Senior Fellow, Precourt Institute for Energy

- Professor (By courtesy), Materials Science and Engineering
- Professor (By courtesy), Chemistry
- Member, Bio-X
- Affiliate, Precourt Institute for Energy
- Faculty Fellow, Stanford ChEM-H
- Member, Stanford Neurosciences Institute
- Affiliate, Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Director, Stanford Wearable Electronics Initiative (eWEAR), (2016- present)

HONORS AND AWARDS

- Applied Polymer Science Award, American Chemical Society (ACS) (2017)
- Member, National Academy of Inventors, National Academy of Inventors (2017)
- Women in Science Award, L'Oreal Foundation and UNESCO (2017)
- Member, National Academy of Engineering, National Academy of Engineering (2016)
- ACS POLY Fellow, American Chemical Society (ACS) Polymer Division (POLY) (2014)
- Andreas Acrivos Award for Professional Progress in Chemical Engineering, American Institute of Chemical Engineers (AICHE) (2014)
- MRS Fellow, Materials Research Society (MRS) (2014)
- ACS Polymer Division Carl S. Marvel Creative Polymer Chemistry Award, American Chemical Society (ACS) (2013)
- Honorary Guest Professorship, Soochow University, China (2013)
- AAAS Fellow, American Association for the Advancement of Science (AAAS) (2012)
- Cheung Kong Scholar, Li Ka Shing Foundation and Chinese Ministry of Education (2012)
- Honorary Guest Professorship, Nanjing Industry University, China (2012)
- ACS Fellow, American Chemical Society (ACS) (2011)
- ACS PMSE Fellow, American Chemical Society (ACS) Polymer Science and Engineering (PMSE) division (2011)
- Most influential Chinese in the World, Science and Technology Category, Phoenix TV (2011)
- Founder, Board of Directors, C3 Nano Co. (2010-present)
- Honorary Si Yuan Chair Professorship, School of Chemistry and Chemical Engineering, Nanjing University, Nanjing, China (2010-2013)
- David Filo and Jerry Yang Faculty Scholar, Stanford University (2009-2012)
- The Royal Society of Chemistry 2009 Beilby Medal and Prize, Stanford University (2009)
- IUPAC Award, Polymer International (2008)
- SPIE Fellow, SPIE (2008)
- 50 Awards in the Innovator category, Nanotech Briefs (2007)
- Featured in Women in SPIE Optics Planner calendar, SPIE (2007)
- Ranked 4 among the Top 20 most cited authors in the field of Organic Thin Film Transistors, ISI (2007)
- Teaching Excellence Award, Stanford Society of Women Engineering (2007)
- Sloan Research Fellowship, Alfred P. Sloan Foundation (2006)
- Du Pont Science and Technology Award, DuPont (2005)
- Finmeccanica Faculty Scholar, Stanford University (2004-2008)

- Terman Fellow, Stanford University (2004-2007)
- Robert Faculty Scholar, Stanford University (2004-2005)
- Robert Noyce Faculty Scholar, Stanford University (2004-2005)
- 3M Faculty Award, 3M (2004)
- Best Mentor Award, University Relations of Lucent Technologies (2003)
- Top 100 young innovators for this century, MIT Technology Review (2003)
- Zhu Kezhen Distinguished Lecturer, Zhejiang University, Hangzhou city, Zhejiang province, China (2003)
- Elizabeth Crosby Lecturer, University of Michigan, Department of Material Sciences and Engineering (2002)
- Team Innovation Award, American Chemical Society (2002)
- Eastman Lecturer, University of Akron, Department of Polymer Science (2001)
- Editor's Choice of the "Best of the Best" in new technology, R&D Magazine (2001)
- R&D 100 Award for the work on Printed Plastic Circuits for Electronic Paper Displays, R&D Magazine (2001)
- Top 10 Research Breakthroughs for work on large scale integrated circuits based on organic materials, Science Magazine (2000)
- Top 100 Young Engineers, National Academy of Engineering (2000)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- International Advisory Board, Accounts Chemical Reviews (2017 - present)
- International Advisory Board, J. Am. Chem. Soc. (2015 - present)
- Associate Editor, Chemical Science (2014 - 2016)
- International Editorial Advisory Board, Advanced Materials (2013 - present)
- International Editorial Advisory Board, Materials Horizon (2013 - present)
- International Editorial Advisory Board, Nanoscale (2012 - present)
- International Editorial Advisory Board, Advanced Energy Materials (2012 - present)
- International Editorial Advisory Board, Chemical Communications (2012 - present)
- Board of Directors, C3 Nano, Co. (2011 - present)
- International Editorial Advisory Board, Nature Asia Materials (2011 - present)
- International Editorial Advisory Board, ACS Nano (2011 - present)
- International advisory board member, LG Display (2010 - present)
- Conference Chair, Gordon Research Conference on Electronic Processes in Organic Materials (2010 - 2010)
- Board Member, National Academies Board on Chemical Sciences and Technology (2009 - 2012)
- Executive Committee Member/Member-at-Large, Division of Polymer Materials Science and Engineering, American Chemical Society (2009 - 2012)
- Associate Editor, Synthetic Metals (2009 - 2011)
- International Editorial Advisory Board, Chemistry of Materials (2006 - 2011)
- Scientific Advisory Board Member, Plastic Electronics Foundation (2006 - 2009)
- Associate Editor, Polymer Review (2004 - 2008)
- Board of Directors, Material Research Society (MRS) (2003 - 2005)
- International Editorial Advisory Board, Materials Today (2002 - present)
- Meeting chair, Materials Research Society Spring Meeting (2002 - 2002)
- International Editorial Advisory Board, Advanced Functional Materials (2001 - 2005)
- Executive Committee Member/Member-at-Large, Division of Polymer Materials Science and Engineering, American Chemical Society (2000 - 2006)

PROFESSIONAL EDUCATION

- PhD, The University of Chicago (1995)

LINKS

- Bao Research Group: http://baogroup.stanford.edu

Teaching

COURSES

2017-18

- Micro and Nanoscale Fabrication Engineering: CHEMENG 140, CHEMENG 240 (Win)
- Special Topics in Functional Organic Materials for Electronic and Optical Devices: CHEMENG 513 (Aut, Win, Spr, Sum)
- Undergraduate Honors Seminar: CHEMENG 191H (Aut, Win, Spr)

2016-17

- Micro and Nanoscale Fabrication Engineering: CHEMENG 140, CHEMENG 240 (Win)
- Polymer Chemistry: CHEMENG 464 (Aut)
- Special Topics in Functional Organic Materials for Electronic and Optical Devices: CHEMENG 513 (Aut, Win, Spr, Sum)
- Undergraduate Honors Seminar: CHEMENG 191H (Aut, Win, Spr)

2015-16

- Equilibrium Thermodynamics: CHEMENG 110 (Win)
- Special Topics in Functional Organic Materials for Electronic and Optical Devices: CHEMENG 513 (Aut, Win, Spr, Sum)

2014-15

- Equilibrium Thermodynamics: CHEMENG 110 (Win)
- Micro and Nanoscale Fabrication Engineering: CHEMENG 140, CHEMENG 240 (Win)
- Polymer Chemistry: CHEMENG 464 (Aut)
- Special Topics in Functional Organic Materials for Electronic and Optical Devices: CHEMENG 513 (Aut, Win, Spr, Sum)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Zhihua Chen

Postdoctoral Faculty Sponsor

Chibueze Amanchukwu, Levent Beker, Tannaz Ebrahimi Azarbayjan, Dawei Feng, Amir Foudeh, Yuanwen Jiang, Jiheong Kang, Jaemin Kim, Min Ah Lee, Jinxing Li, Jia Liu, Maria Lukatskaya, Simiao Niu, Jihye Park, Helen Tran, Ioulia Tzouvadaki, Sihong Wang, Hung-Chin Wu, Yilei Wu, Jie Xu, Xuzhou Yan, Zhitao Zhang, Jukuan Zheng, Yuqing Zheng

Doctoral Dissertation Advisor (AC)

Ging-Ji Nathan Wang

Publications

PUBLICATIONS

- **Biocompatible and totally disintegrable semiconducting polymer for ultrathin and ultralightweight transient electronics** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*

Lei, T., Guan, M., Liu, J., Lin, H., Pfattner, R., Shaw, L., McGuire, A. F., Huang, T., Shao, L., Cheng, K., Tok, J. B., Bao, Z.
2017; 114 (20): 5107-5112

- **Separation of Semiconducting Carbon Nanotubes for Flexible and Stretchable Electronics Using Polymer Removable Method** *ACCOUNTS OF CHEMICAL RESEARCH*
  Lei, T., Pochorovski, I., Bao, Z.
  2017; 50 (4): 1096-1104
- **A highly stretchable, transparent, and conductive polymer.** *Science advances*
  Wang, Y., Zhu, C., Pfattner, R., Yan, H., Jin, L., Chen, S., Molina-Lopez, F., Lissel, F., Liu, J., Rabiah, N. I., Chen, Z., Chung, J. W., Linder, et al
  2017; 3 (3)
- **Highly stretchable polymer semiconductor films through the nanoconfinement effect** *SCIENCE*
  Xu, J., Wang, S., Wang, G. N., Zhu, C., Luo, S., Jin, L., Gu, X., Chen, S., Feig, V. R., To, J. W., Rondeau-Gagne, S., Park, J., Schroeder, et al
  2017; 355 (6320): 59-?
- **The rise of plastic bioelectronics** *NATURE*
  Someya, T., Bao, Z., Malliaras, G. G.
  2016; 540 (7633): 379-385
- **Intrinsically stretchable and healable semiconducting polymer for organic transistors** *NATURE*
  Oh, J. Y., Rondeau-Gagne, S., Chiu, Y., Chortos, A., Lissel, F., Wang, G. N., Schroeder, B. C., Kurosawa, T., Lopez, J., Katsumata, T., Xu, J., Zhu, C., Gu, et al
  2016; 539 (7629): 411-415
- **Skin-inspired organic electronic materials and devices** *MRS BULLETIN*
  Bao, Z.
  2016; 41 (11): 897-902
- **Pursuing prosthetic electronic skin.** *Nature materials*
  Chortos, A., Liu, J., Bao, Z.
  2016; 15 (9): 937-950
- **A highly stretchable autonomous self-healing elastomer** *NATURE CHEMISTRY*
  Li, C., Wang, C., Keplinger, C., Zuo, J., Jin, L., Sun, Y., Zheng, P., Cao, Y., Lissel, F., Linder, C., You, X., Bao, Z.
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- **Stretchable Self-Healing Polymeric Dielectrics Cross-Linked Through Metal-Ligand Coordination** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Rao, Y., Chortos, A., Pfattner, R., Lissel, F., Chiu, Y., Feig, V., Xu, J., Kurosawa, T., Gu, X., Wang, C., He, M., Chung, J. W., Bao, et al
  2016; 138 (18): 6020-6027
- **Hierarchical N-Doped Carbon as CO2 Adsorbent with High CO2 Selectivity from Rationally Designed Polypyrrole Precursor** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  To, J. W., He, J., Mei, J., Haghpanah, R., Chen, Z., Kurosawa, T., Chen, S., Bae, W., Pan, L., Tok, J. B., Wilcox, J., Bao, Z.
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- **Removable and Recyclable Conjugated Polymers for Highly Selective and High-Yield Dispersion and Release of Low-Cost Carbon Nanotubes.** *Journal of the American Chemical Society*
  Lei, T., Chen, X., Pitner, G., Wong, H. P., Bao, Z.
  2016; 138 (3): 802-805
- **Fast and reversible thermoresponsive polymer switching materials for safer batteries** *NATURE ENERGY*
  Chen, Z., Hsu, P., Lopez, J., Li, Y., To, J. W., Liu, N., Wang, C., Andrews, S. C., Liu, J., Cui, Y., Bao, Z.
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- **Ultrahigh electrical conductivity in solution-sheared polymeric transparent films.** *Proceedings of the National Academy of Sciences of the United States of America*
  Worfolk, B. J., Andrews, S. C., Park, S., Reinspach, J., Liu, N., Toney, M. F., Mannsfeld, S. C., Bao, Z.
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- **A skin-inspired organic digital mechanoreceptor** *SCIENCE*
  Tee, B. C., Chortos, A., Berndt, A., Nguyen, A. K., Tom, A., McGuire, A., Lin, Z. C., Tien, K., Bae, W., Wang, H., Mei, P., Chou, H., Cui, et al

2015; 350 (6258): 313-?

- **A chameleon-inspired stretchable electronic skin with interactive colour changing controlled by tactile sensing** *NATURE COMMUNICATIONS*
  Chou, H., Nguyen, A., Chortos, A., To, J. W., Lu, C., Mei, J., Kurosawa, T., Bae, W., Tok, J. B., Bao, Z.
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- **Flow-enhanced solution printing of all-polymer solar cells** *NATURE COMMUNICATIONS*
  Diao, Y., Zhou, Y., Kurosawa, T., Shaw, L., Wang, C., Park, S., Guo, Y., Reinspach, J. A., Gu, K., Gu, X., Tee, B. C., Pang, C., Yan, et al
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- **H-Bonded Supramolecular Polymer for the Selective Dispersion and Subsequent Release of Large-Diameter Semiconducting Single-Walled Carbon Nanotubes** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
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- **Skin-inspired electronic devices** *MATERIALS TODAY*
  Chortos, A., Bao, Z.
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- **Semiconducting polymer nanoparticles as photoacoustic molecular imaging probes in living mice.** *Nature nanotechnology*
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  Wang, C., Wu, H., Chen, Z., McDowell, M. T., Cui, Y., Bao, Z.
  2013; 5 (12): 1043-1049
- **Stretchable and self-healing polymers and devices for electronic skin** *PROGRESS IN POLYMER SCIENCE*
  Benight, S. J., Wang, C., Tok, J. B., Bao, Z.
  2013; 38 (12): 1961-1977

- **25th Anniversary Article: The Evolution of Electronic Skin (E-Skin): A Brief History, Design Considerations, and Recent Progress** *ADVANCED MATERIALS*
  Hammock, M. L., Chortos, A., Tee, B. C., Tok, J. B., Bao, Z.
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- **Direct growth of aligned graphitic nanoribbons from a DNA template by chemical vapour deposition.** *Nature communications*
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- **Effects of Odd-Even Side Chain Length of Alkyl-Substituted Diphenylbithiophenes on First Monolayer Thin Film Packing Structure** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Akkerman, H. B., Mannsfeld, S. C., Kaushik, A. P., Verploegen, E., Burnier, L., Zoombelt, A. P., Saathoff, J. D., Hong, S., Atahan-Evrenk, S., Liu, X., Aspuru-Guzik, A., Toney, M. F., Clancy, et al
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- **Solution coating of large-area organic semiconductor thin films with aligned single-crystalline domains.** *Nature materials*
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  2013; 12 (7): 665-671
- **Stable Li-ion battery anodes by in-situ polymerization of conducting hydrogel to conformally coat silicon nanoparticles.** *Nature communications*
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  2013; 4: 1943-?
- **Integrated Materials Design of Organic Semiconductors for Field-Effect Transistors** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Mei, J., Diao, Y., Appleton, A. L., Fang, L., Bao, Z.
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- **Flexible Wireless Temperature Sensors Based on Ni Microparticle-Filled Binary Polymer Composites** *ADVANCED MATERIALS*
  Jeon, J., Lee, H., Bao, Z.
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- **Stable Li-ion Battery Anodes by In-situ Polymerization of Conducting Hydrogel to Conformally Coat Silicon Nanoparticles** *Nature Comm.*
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- **Flexible polymer transistors with high pressure sensitivity for application in electronic skin and health monitoring.** *Nature communications*
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  Diao, Y., Tee, B., C-K., Giri, G., Xu, J., Kim, D., H., Becerril, H., A., Bao, Z.
  2013; 12: 665-671
- **Flexible polymer transistors with high pressure sensitivity for application in electronic skin and health monitoring** *Nature Comm.*
  Schwartz, G., Tee, B., C-K., Mei, J., Appleton, A., L., Kim, H., D, Wang, H., Bao, Z.
  2013; 4: 1859
- **An ultra-sensitive resistive pressure sensor based on hollow-sphere microstructure induced elasticity in conducting polymer film** *Nature Comm.*
  Pan, L., Chortos, A., Yu, G., Wang, Y., Isaacson, S., Allen, R., Bao, Z.
  2013
- **A Flexible Bimodal Sensor Array for Simultaneous Sensing of Pressure and Temperature** *Adv. Mater.*
  Tien, N., T., Jeon, S., Kim, D., I., Trung, T., Q., Jang, M., Hwang, B., U., Bao, Z.
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- **Stretchable LEDs: Light-emitting electronic skin** *Nature Photonics*
  Vosgueritchian, M., Tok, J., B.-H., Bao, Z.
  2013; 7: 769-771
- **Direct Growth of Aligned Graphitic Nanoribbons from a DNA Template by Chemical Vapour Deposition** *Nature Comm.*

Sokolov, A., N., Yap, F., L., Liu, L., Kim, K., Ci, L., Johnson, O., B., Bao, Z.
2013; 4: 2402

- **25th Anniversary Article: The Evolution of Electronic Skin (E-Skin): A Brief History, Design Considerations, and Recent Progress** *Adv. Mat.*
  Hammock, M., L., Chortos, A., Tee, B., C-K., Tok, J., B.-H., Bao, Z.
  2013; 25: 5997-6038
- **Ultra-High Mobility Transparent Organic Thin Film Transistors Via an Off-Center Spin-Coating Method** *Nature Comm.*
  Yuan, Y., Giri, G., Ayzner, A., L., Zoombelt, A., P., Mannsfeld, S., C.B., Chen, J., Bao, Z.
  2013
- **Highly stable organic polymer field-effect transistor sensor for selective detection in the marine environment** *Nature Comm.*
  Knopfmacher, O., Hammock, M., L., Appleton, A., L., Schwartz, G., Mei, J., Lei, T., Bao, Z.
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- **An electrically and mechanically self-healing composite with pressure- and flexion-sensitive properties for electronic skin applications** *NATURE NANOTECHNOLOGY*
  Tee, B. C., Wang, C., Allen, R., Bao, Z.
  2012; 7 (12): 825-832
- **Hierarchical nanostructured conducting polymer hydrogel with high electrochemical activity** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Pan, L., Yu, G., Zhai, D., Lee, H. R., Zhao, W., Liu, N., Wang, H., Tee, B. C., Shi, Y., Cui, Y., Bao, Z.
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- **2-(2-Methoxyphenyl)-1,3-dimethyl-1H-benzoimidazol-3-ium Iodide as a New Air-Stable n-Type Dopant for Vacuum-Processed Organic Semiconductor Thin Films** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Wei, P., Menke, T., Naab, B. D., Leo, K., Riede, M., Bao, Z.
  2012; 134 (9): 3999-4002
- **Chemical and Engineering Approaches To Enable Organic Field-Effect Transistors for Electronic Skin Applications** *ACCOUNTS OF CHEMICAL RESEARCH*
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- **Tuning charge transport in solution-sheared organic semiconductors using lattice strain** *NATURE*
  Giri, G., Verploegen, E., Mannsfeld, S. C., Atahan-Evrenk, S., Kim, D. H., Lee, S. Y., Becerril, H. A., Aspuru-Guzik, A., Toney, M. F., Bao, Z.
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- **Siloxane-Terminated Solubilizing Side Chains: Bringing Conjugated Polymer Backbones Closer and Boosting Hole Mobilities in Thin-Film Transistors** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
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  2011; 133 (50): 20130-20133
- **Skin-like pressure and strain sensors based on transparent elastic films of carbon nanotubes** *NATURE NANOTECHNOLOGY*
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- **From computational discovery to experimental characterization of a high hole mobility organic crystal** *NATURE COMMUNICATIONS*
  Sokolov, A. N., Atahan-Evrenk, S., Mondal, R., Akkerman, H. B., Sanchez-Carrera, R. S., Granados-Focil, S., Schrier, J., Mannsfeld, S. C., Zoombelt, A. P., Bao, Z., Aspuru-Guzik, A.

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