

**Hakan Usta, Ph. D.**  
**Associate Professor**

Department of Materials Science and Nanotechnology Engineering  
Faculty of Engineering  
Abdullah Gül University, Kocasinan, Kayseri, Turkey  
Office: 90 352 224 88 00 (7205)  
Email: hakan.usta@agu.edu.tr

**EDUCATION**

---

**Ph.D. in Chemistry** 2004 – 2008  
**Northwestern University, Evanston, IL, USA**  
**Department of Chemistry and Materials Research Center**

Dissertation: “Solution-Processable Molecular and Polymeric Semiconductors for Ambient-Stable Organic Field-Effect Transistors”

Advisor: Professor Tobin J. Marks  
GPA 3.9/4.0, Cumulative

**B.S. in Chemistry** 2000 – 2004  
**Bilkent University, Ankara, Turkey**  
**Department of Chemistry**

Major: Chemistry (Ranked 1<sup>st</sup>, Honors in Chemistry)  
GPA 3.7/4.0, Cumulative

**PROFESSIONAL EXPERIENCE**

---

**Department of Materials Science and Nanotechnology**  
**Faculty of Natural Sciences and Engineering**  
**Abdullah Gul University, Kayseri, Turkey**

**Associate Professor** January 2014 – Present

**Assistant Professor** September 2013 – January 2014

**Project Leader** 2011 – 2013  
**Polyera Corporation, Illinois Science & Technology Park, Skokie, IL, USA**

- Lead the Synthetic Efforts on a three-years joint project between Polyera Corporation, Institute for Nanostructured Materials CNR (Bologna, Italy), and Saes-Getters (Milan, Italy) (Project Budget: \$3,000,000)
- Worked on the synthesis of fluorescent  $\pi$ -conjugated systems and electron/hole transporting layers for the fabrication of multi-layer OLET devices with a world-record device performance (EQE > 5%) (**published in Nature Materials**).
- Developed new semiconductors, functional organic materials for OLET fabrication of green, blue, and red emission.

**Senior Research Scientist** 2008 – 2011  
**Polyera Corporation, Illinois Science & Technology Park, Skokie, IL, USA**

- Granted/Applied **13 US patents** and published research articles including **Nature Materials**, **JACS**, and **Advanced Materials**.
- Worked on the development of new donor polymers with **world-record organic solar cell performance (PCE > 9 %)**.

- Developed a photocurable dielectric polymer with high operational stability in OTFTs, which is currently under **synthetic scale-up/optimization for real manufacturing**.
- Worked on the development of new molecular semiconductors exhibiting **breakthrough *n*-channel mobilities ( $\mu_e > 1.0 - 2.5 \text{ cm}^2/\text{V}\cdot\text{s}$ ), which are now commercially available through the company**.
- Scaling up multiple step synthesis of ActivInk™ materials, available through the company (>\$100,000 revenue for the company).
- Collaborated with numerous research groups at Stanford University (USA), Northwestern University (USA), UC Berkeley, and Bilkent University.
- As Polyera Research&Development Team, awarded 3 prizes from Europe and USA for the excellence in materials research and the development of high-performance functional organic materials for flexible optoelectronic applications.
- Polyera is currently the leading supplier of functional inks to the field of printed and flexible organic electronic technology. Currently, it offers around 20 functional organic materials with the state of the art electrical performance, and it is the only company offering air-stable high performance *n*-channel organic semiconductors.

**Graduate Research Assistant**

2004 – 2008

**Department of Chemistry, Northwestern University, Evanston, IL, USA**

- Designed, synthesized and characterized electron-deficient organic molecules and corresponding homo- and copolymers as air-stable and solution-processable *n*- and *p*-channel semiconductors.
- Fabricated Organic Field Effect Transistors (OFETs) via vapor- and solution-phase fabrication techniques.
- Characterized OFET devices under ambient/inert conditions and evaluated electrical properties.
- Designed and developed a new *n*-channel semiconducting molecule/polymer exhibiting one of the highest air-stable, solution-based FET device performance reported to date with excellent ambient stability.
- Synthesized a new highly polarizable Cyanine dye and conducted a self-assembly study using the molecule as a nanodielectric for OFETs.
- Collaborated with materials scientists, physicists on numerous projects.
- Presented findings on projects at local and national conferences.
- Supervised 2 undergraduate students for summer research, trained on organic synthesis and purification techniques.

**Undergraduate Research Assistant**

2002

**Department of Chemistry, Texas A&M University, College Station, TX, USA**

- Worked on the synthesis and characterization of a Truncated-Pateamine A derivative.
- Presented findings in the NSF-REU Program Meeting.

**PATENTS (10 GRANTED AND 3 APPLICATIONS)**

---

1. A. Facchetti, **H. Usta**, H. Pan, M. Drees, M. Denti “Conjugated Polymers and their use in optoelectronic devices” **US Patent Number: US8883958 B2**; Publication Date: Nov 11, 2014; Priority Date: Mar 22, 2012. (EP2828904 A1; WO2013142835 A1)

2. Z. Zhu, H. Pan, M. Drees, **H. Usta**, S. Lu, A. Facchetti, "Conjugated Polymers and their use in optoelectronic devices" **US Patent Number: US8772442 B2**; EU Patent Number EP2432817 B1; Publication Date: Jul 8, 2014; Priority Date: Oct 22, 2010.

3. **H. Usta**, P. Tan, Y. Xia, Z. Chen, Y. Zheng, A. Facchetti, “Photocurable polymeric materials and related electronic materials” **US Patent Number: US8878169 B2**; Publication Date: Nov 4, 2014; Priority Date: Feb 7, 2012.
4. **H. Usta**, Z. Chen, A. Facchetti, “Thieno-coroneneimide semiconducting compounds and polymers” **US Patent Number: US8329855 B2**; Publication Date: Dec 11, 2012; Priority Date: Mar 26, 2010.
5. A. Facchetti, Z. Chen, **H. Usta**, C. Newman, H. Yan, “Semiconducting Compounds and Related Compositions and Devices” **US Patent Number: US8598575 B2**; Publication Date: Dec 3, 2013; Priority Date: Aug 29, 2010. (EP2612376 A2; WO2012030662 A2)
6. J. Quinn, Y. Zheng, Z. Chen, **H. Usta**, C. Newman, H. Yan, A. Facchetti, “Organic semiconductors and devices incorporating same”, **US Patent Number: US8440828 B2**; Publication Date: May 14, 2013; Priority Date: Dec 29, 2009. (EP2519523 A1; WO2011082234 A1; CN102933581 A)
7. A. Facchetti, **H. Usta**, J. Wang, C. Huang, M. Denti, C. Newman, “Compounds having semiconducting properties and related compositions and devices” **US Patent Number: US9067886 B2**; Publication Date: Jun 30, 2015; Priority Date: Nov 22, 2011. (CN104126235 A; WO2013078407 A1)
8. T.J. Marks, A. Facchetti, **H. Usta**, “Conjugated monomers and polymers and preparation and use thereof”, **US Patent Number: US7928249 B2**; Publication Date: Apr 19, 2011; Priority Date: Aug 2, 2007.
9. T. J. Marks, A. Facchetti, G. Lu, **H. Usta**, J. Letizia, “Silole-based polymers and semiconductor materials prepared from the same”, **US Patent Number: US7605225 B2**; Publication Date: Oct 20, 2009; Priority Date: May 11, 2006.
10. **H. Usta**, M. Denti, Chris Sheets, A. Facchetti, "Semiconducting compounds and optoelectronic devices incorporating thereof" **US Patent Number: US9312501 B2**; Publication Date: Apr 12, 2016; Priority Date: Sep 28, 2012.
11. **H. Usta**, D. Boudinet, J. Quinn, A. Facchetti “Compounds having semiconducting properties and related compositions and devices” **WIPO-PCT Patent, 2013, WO 2013039842**.
12. Facchetti, Antonio; **Usta, Hakan**; Denti, Mitchell; Biondo, Viviana; Soldano, Caterina; Muccini, Michele " Organic electroluminescent transistor " **Eur. Pat. Appl. (2016), EP 2978035 A1 20160127**.
13. Biondo, Viviana; Generali, Gianluca; Stefani, Andrea; Muccini, Michele; Denti, Mitchell; **Usta, Hakan**; Facchetti, Antonio "Organic electroluminescent transistors with improved light emission characteristics for maximizing light emission efficiency and brightness" **Eur. Pat. Appl. (2016), EP 2978037 A1 20160127**.

## BOOK CHAPTERS

---

**Hakan Usta** and Antonio Facchetti, “Chapter 1: Polymeric and Small-Molecule Semiconductors for Organic Field-Effect Transistors”, *Large Area and Flexible Electronics*, First Edition. Edited by Mario Caironi and Yong-Young Noh. ISBN: 978-3-527-33639-5, Published March 2015 by Wiley-VCH Verlag GmbH & Co. KGaA.

**Hakan Usta** and Antonio Facchetti, “Chapter: Organic Semiconductors for Transparent Electronics”, *Flexible Carbon-based Electronics*, First Edition. Edited by Paolo Samori and Vincenzo Palermo. In Press. To be Published 2017 by Wiley-VCH Verlag GmbH & Co. KGaA.

**PUBLICATIONS (TOTAL CITATIONS > 2700, CITATIONS PER ARTICLE: 60)**

---

\* denotes corresponding author(s), (IF=Impact Factor)

1. M. Ozdemir, S. W. Kim, H. Kim, M.-G. Kim, B. J. Kim\*, C. Kim\*, **H. Usta\***  
"Semiconducting Copolymers based on meso-Substituted BODIPY for Field-Effect Transistors and Inverted Solar Cells"  
2017, **Submitted, Under Review.**
2. B. D. Choi, J. Park, K.-J. Baeg, M. Kang, J. S. Heo, S. Kim, J. Won, S. Yu, K.-H. Ahn, J. Hong, D.-Y. Kim, **H. Usta**, C. Kim\*, S. K. Park\*, M.-G. Kim\*  
"Optimized Activation of Solution-Processed Amorphous Oxide Semiconductors for Flexible Transparent Conductive Electrodes"  
2017, **Submitted, Under Review.**
3. M. Yilmaz, E. Babur, M. Özdemir, R. L. Giesecking, Y. Dede, U. Tamer, G. C. Schatz,\* A. Facchetti,\* **H. Usta,\*** G. Demirel\*  
"Nanostructured Superhydrophobic Organic Semiconductor Films for Ultrasensitive Molecular Detection with Surface-Enhanced Raman Spectroscopy"  
**Nature Materials**, 2017, 16, 918-924. (IF = **39.74**)
4. M. Yilmaz, M. Erkartal, M. Özdemir, Ü. Şen, **H. Usta,\*** G. Demirel\*  
"Three Dimensional Au-Coated Electro sprayed Nanostructured BODIPY Films on Aluminum Foil as Surface-Enhanced Raman Scattering Platforms and Their Catalytic Applications"  
**ACS Applied Materials & Interfaces**, 2017, 9, 18199–18206. (IF = **7.50**)
5. R. Ozdemir, D. Choi, M. Ozdemir, G. Kwon, H. Kim, U. Sen, C. Kim\*, **H. Usta\***  
"Design, Synthesis, and Characterization of Ultralow Bandgap Molecular Semiconductors for Ambient-Stable and Solution-Processable Ambipolar Organic Field-Effect Transistors"  
**Journal of Materials Chemistry C**, 2017, 5, 2368-2379. (IF = **5.26**)
6. M. Ozdemir, D. Choi, Y. Zorlu, B. Cosut, H. Kim, C. Kim\*, **H. Usta\***  
"A New Rod-Shaped BODIPY-Acetylene Molecule for Solution-Processed Semiconducting Microribbons in N-Channel Organic Field-Effect Transistors"  
**New Journal of Chemistry (RSC)**, 2017, 41, 6232-6240. (IF = **3.27**)
7. R. Ozdemir, D. Choi, M. Ozdemir, H. Kim, S. T. Kostakoğlu, H. Kim, C. Kim\*, **H. Usta\***  
"Liquid-Crystalline Semiconductor Molecule with a low-LUMO for Air-Stable and Solution-Processed N-Channel Field-Effect Transistors"  
**ChemPhysChem (Wiley)**, 2017, 18, 850–861. (IF = **3.08**)
8. M. Erkartal, U. Erkilic, B. Tam, **H. Usta**, O. Yazaydin\*, J. T. Hupp\*, O. K. Farha\*, U. Sen\*  
"From 2-methylimidazole to 1,2,3-triazole: A topological transformation of ZIF-8 and ZIF-67 by bridging ligand replacement"  
**Chemical Communications**, 2017, 53, 2028-2031. (IF = **6.32**)

9. A. Tataroğlu, A. G. Al-Sehemi, M. Özdemir, R. Özdemir, **H. Usta**, A. A. Al-Ghamdi, W. A. Farooq, F. Yakuphanoglu\*  
"Frequency and electric field controllable photodevice: Fytronix Device"  
**Physica B: Condensed Matter (Elsevier)**, 2017, 519, 53-58. (IF =1.39)
10. R. Liguori, **H. Usta**, S. Fusco, A. Facchetti, G. D. Licciardo, L. Di Benedetto, A. Rubino  
"Insights into Interface Treatments in P-Channel Organic Thin Film Transistors Based on a Novel Molecular Semiconductor"  
**IEEE Transactions on Electron Devices**, 2017, 64, 1-7. (IF = 2.61)
11. K. Kim, Y. Kim, J. Yang, K. Ha, **H. Usta**, J. Lee, C. Kim\*  
"Enhanced mass transfer rate and solubility of methane via addition of alcohols for *Methylosinus trichosporium* OB3b fermentation"  
**Journal of Industrial and Engineering Chemistry (Elsevier)**, 2017, 46, 350–355. (IF = 4.42)
12. R.O. Ocaya, M. Ozdemir, R. Ozdemir, A. Al-Ghamdi, **H. Usta**, W. A. Farooq, F. Yakuphanoglu\*  
"Ambipolar Small Molecular Semiconductor-Based Heterojunction Diode"  
**Synthetic Metals**, 2016, 221, 48–54. (IF = 2.43)
13. N. Azum\*, L. A. Taib, Y. M. Al Angari, A. M. Asiri, M. Denti, W. Zhao, **H. Usta\***, A. Facchetti\*  
" $\pi$ -Conjugated Donor-Acceptor Small Molecule Thin-films on Gold Electrodes for Reducing the Metal Work-Function"  
**Thin Solid Films (Elsevier)**, 2016, 616, 320–327. (IF = 1.88)
14. M. Ozdemir, D. Choi, G. Kwon, Y. Zorlu, B. Cosut, H. Kim, A. Facchetti\*, C. Kim\*, **H. Usta\***  
"Solution-Processable BODIPY-Based Small Molecules for Semiconducting Microfibers in Organic Thin-Film Transistors"  
**ACS Applied Materials & Interfaces**, 2016, 8, 14077–14087. (IF = 7.50)
15. M. Erkartal, A. Aslan, S. Dadi, U. Erkilic, O. Yazaydin, **H. Usta**, U. Sen\* "Anhydrous Proton Conducting poly(vinyl alcohol) (PVA)/ poly(2-acrylamido-2-methylpropane sulfonic acid) (PAMPS)/1,2,4-Triazole Composite Membrane"  
**International Journal of Hydrogen Energy**, 2016, 41, 11321–11330. (IF = 3.58)
16. G.-S. Ryu, Z. Chen, **H. Usta\***, Y.-Y. Noh\*, A. Facchetti\* "NaphthaleneDiimide-Based Polymeric Semiconductors. Effect of Chlorine Incorporation and n-Channel Transistors Operating in Water"  
**MRS (Materials Research Society) Communications**, 2016, 6, 47-60. (IF = 1.82)
17. M. Ozdemir, D. Choi, G. Kwon, Y. Zorlu, H. Kim, M.-G. Kim, S.Y. Seo, U. Sen, M. Citir, C. Kim\*, **H. Usta\*** "Design, Synthesis, and Characterization of  $\alpha,\omega$ -Disubstituted Indeno[1,2-b]fluorene-6,12-dione-Thiophene Molecular Semiconductors. Enhancement of Ambipolar Charge Transport Through Synthetic Tailoring of Alkyl Substituents"  
**RSC Advances**, 2016, 6, 212-226. (IF = 3.11)
18. M. Ozdemir, S. Genc, R. Ozdemir, Y. Altintas, M. Citir, U. Sen, E. Mutlugun,\* **H. Usta\*** "Cis-Trans Isomerization Assisted Synthesis of Yellow Fluorescent Maleic Anhydride Derivatives for White-Light Generation"  
**Synthetic Metals**, 2015, 210, 192–200. (IF = 2.43)

19. M. Erkartal, **H. Usta**, M. Citir, U. Sen\* "*Proton Conducting Poly(vinyl alcohol) (PVA)/ Poly(2-acrylamido-2-methylpropane sulfonic acid) (PAMPS)/ Zeolitic Imidazolate Framework-8 (ZIF-8) Ternary Composite Membrane*"  
**Journal of Membrane Science**, 2016, 499, 156-163. (IF = 6.04)
20. E. Elgazzar, M. Özdemir, H. Usta, A. A. Al-Ghamdi, A. Dere, F. El-Tantawy, F. Yakuphanoglu\* "*Logarithmic Organic Photodetectors*"  
**Synthetic Metals**, 2015, 210, 288–296. (IF = 2.43)
21. V. Figà, C. Chiappara, F. Ferrante, M. P. Casaletto, F. Principato, Z. Chen, **H. Usta**, A. Facchetti,\* B. Pignataro\* "*Symmetric Naphthalenediimidequaterthiophenes for Electropolymerized Electrochromic Thin Films*"  
**Journal of Materials Chemistry C**, 2015, 3, 5985-5994. (IF = 5.26)
22. M. Yilmaz, M. Ozdemir, H. Erdogan, U. Tamer, U. Sen, A. Facchetti\*, **H. Usta\***, G. Demirel\* "*Micro-/Nano-Structured Highly Crystalline Organic Semiconductor Films for Surface-Enhanced Raman Spectroscopy Applications*"  
**Advanced Functional Materials**, 2015, 25, 5669–5676. (IF = 12.12)
23. A. Canlier, U. V. Ucak, **H. Usta**, C. Chob, J.-Y. Leeb, U. Sen, M. Citir "Development of Highly Transparent Pd-Coated Ag Nanowire Electrode for Displays and Catalysis Applications"  
**Applied Surface Science (Elsevier)**, 2015, 350, 79-86. (IF = 3.39)
24. I. A. Grimaldi, R. Miscioscia, G. Nenna, F. Villani, C. Minarini, M. Petrosino, A. Rubino, **H. Usta**, A. Facchetti "*Photosensing properties of pentacene OFETs based on a novel PMMA copolymer gate dielectric*"  
**Journal of Display Technology (IEEE)**, 2015, 11, 533-540. (IF = 1.53)
25. U. Sen,\* **H. Usta\***, O. Acar, M. Citir, A. Canlier, A. Bozkurt, A. Ata "*Enhancement of High-Temperature Proton Conductivity of Poly(vinylphosphonic acid) (PVPA)-Poly(2,5-benzimidazole) (ABPBI) Membranes via In-Situ Polymerization*"  
**Macromolecular Chemistry and Physics**, 2015, 216, 106-112. (IF = 2.50)
26. **H. Usta\***, C. Sheets, M. Denti, G. Generali, R. Capelli, S. Lu, X. Yu, M. Muccini,\* A. Facchetti\* "*Perfluoroalkyl-Functionalized Thiazole-Thiophene Oligomers as N-Channel Semiconductors in Organic Field-Effect and Light-Emitting Transistors*"  
**Chemistry of Materials**, 2014, 26, 6542–6556. (IF = 9.47)
27. S. Fabiano, **H. Usta**, R. Forchheimer, X. Crispin, A. Facchetti,\* M. Berggren\* "*Selective Remanent Ambipolar Charge Transport in Polymeric Field-Effect Transistors For High- Performance Logic Circuits Fabricated in Ambient*"  
**Advanced Materials**, 2014, 26, 7438-7443. (IF = 19.79)
28. **H. Usta\***, M. D. Yilmaz, A.-J. Avestro, D. Boudinet, M. Denti, W. Zhao, J. F. Stoddart,\* A. Facchetti\* "*BODIPY–Thiophene Copolymers as p-Channel Semiconductors for Organic Thin-Film Transistors*"  
**Advanced Materials**, 2013, 25, 4327-4334. (IF = 19.79)  
(Published in the "Special Issue: Organic and Hybrid Materials for Flexible Electronics").
29. X. Guo, J. Quinn, Z. Chen, **H. Usta**, Y. Zheng, Y. Xia, J. W. Hennek, R. P. Ortiz, T. J. Marks,\* A. Facchetti\* "*Dialkoxypythiazole: A New Building Block for Head-to-Head Polymer Semiconductors*"

- Journal of the American Chemical Society**, 2013, *135*, 1986-1996. (IF = 13.86)
30. S. Lu,\* M. Drees, Y. Yao, D. Boudinet, H. Yan, H. Pan, J. Wang, Y. Li, **H. Usta**, A. Facchetti\* "3,6-Dithiophen-2-yl-1,4-dihydropyrrolo[3,2-b]pyrrole-2,5-dione (isoDPPT) as an Acceptor Building Block for Opto-Electronics"  
**Macromolecules**, 2013, *46*, 3895-3906. (IF = 5.84)
31. H. Ceylan, C. Ozgit-Akgun, T. S. Erkal, I. Donmez, R. Garifullin, A. B. Tekinay, **H. Usta**, N. Biyikli,\* M.O. Guler\* "Size-Controlled Conformal Nanofabrication of Biotemplated Three-Dimensional TiO<sub>2</sub> and ZnO Nanonetworks"  
**Scientific Reports**, 2013, *3*, 2306. (IF = 4.26)
32. **H. Usta**,\* C. Newman, Z. Chen, A. Facchetti\* "Dithienocoronenediimide-Based Copolymers as Novel Ambipolar Semiconductors for Organic Thin Film Transistors"  
**Advanced Materials**, 2012, *24*, 3678-3684. (IF = 19.79)  
(Selected in Top 40 Articles by "Materials Views", Wiley-VCH, June 19, 2012).
33. H. Huang, Z. Chen, R. P. Ortiz, C. Newman, **H. Usta**, S. J. Lou, J. Youn, Y.-Y. Noh, K.-J. Baeg, L. X. Chen, A. Facchetti,\* T. J. Marks\* "Combining Electron-Neutral Building Blocks with Intramolecular "Conformational Locks" Affords Stable, High-Mobility P- and N-Channel Polymer Semiconductors"  
**Journal of the American Chemical Society**, 2012, *134*, 10966-10973. (IF = 13.86)
34. **H. Usta**, Z. Wang, C. Kim, H. Huang, S. Lu, A. Facchetti,\* T. J. Marks\* "Anthracenedicarboximides as Air-Stable N-Channel Semiconductors for Thin-Film Transistors with Remarkable Current On-Off Ratios"  
**Journal of Materials Chemistry**, 2012, *22*, 4459-4472. (IF = 6.63)  
(Invited Article and Published in the "Special Issue: Organic Optoelectronic Materials").
35. **H. Usta**, A. Facchetti,\* T. J. Marks\* "N-Channel Semiconductor Materials Designed for Organic Complementary Circuits"  
**Accounts of Chemical Research**, 2011, *44*, 501-510. (IF = 20.27)
36. Y.-G. Ha, J. Emery, M. Bedzyk, **H. Usta**, A. Facchetti,\* T. J. Marks\* "Solution-Deposited Organic-Inorganic Hybrid Multilayer Gate Dielectrics. Design, Synthesis, Microstructures, and Electrical Properties, with Thin-Film Transistors"  
**Journal of the American Chemical Society**, 2011, *133*, 10239-10250. (IF = 13.86)
37. R. Capelli,\* S. Toffanin, G. Generali, **H. Usta**, A. Facchetti, M. Muccini,\* "Organic Light-Emitting Transistors with an Efficiency That Out Performs the Equivalent Light-Emitting Diodes"  
**Nature Materials**, 2010, *9*, 496-503. (IF = 39.74)  
(Highlighted by the "Chemistry World News", Royal Society of Chemistry, May 2, 2010).  
(Highlighted by the "Nanowerk Nanotechnology Spotlight" Magazine, May 6, 2010).  
(Highlighted by the "Plastic Electronics" Magazine, May 10, 2010).
38. **H. Usta**, C. Risko, Z. Wang, H. Huang, M. K. Delimeroglu, A. Zhukhovitskiy, A. Facchetti,\* T. J. Marks\* "Design, Synthesis, and Characterization of Ladder-Type Molecules and Polymers. Air-Stable, Solution-Processable n-Channel and Ambipolar Semiconductors for Thin-Film Transistors via Experiment and Theory"  
**Journal of the American Chemical Society**, 2009, *131*, 5586-5608. (IF = 13.86)

39. **H. Usta**, A. Facchetti,\* T. J. Marks\* “*Air-Stable, Solution-Processable n-Channel and Ambipolar Semiconductors for Thin-Film Transistors Based on the Indenofluorenebis(dicyanovinylene) Core*” **Journal of the American Chemical Society**, 2008, *130*, 8580-8581. (IF = 13.86)  
(Highlighted among the top 3 solution-based high-performance small molecular n-channel semiconductor under ambient in a Progress Report/Advanced Materials, March 26, 2010).
40. **H. Usta**, A. Facchetti,\* T. J. Marks\* “*Synthesis and Characterization of Electron-Deficient and Highly Soluble (Bis)Indenofluorene Building Blocks for n-type Semiconducting Polymers*” **Organic Letters**, 2008, *10*, 1385-1388. (IF = 6.58)
41. G. Lu, **H. Usta**, C. Risko, L. Wang, A. Facchetti,\* T. J. Marks\*“*Synthesis, Characterization, and Transistor Response of Semiconducting Silole Polymers with Substantial Hole Mobility and Air Stability. Experiment and Theory*” **Journal of the American Chemical Society**, 2008, *130*, 7670–7685. (IF = 13.86)
42. **H. Usta**, G. Lu, A. Facchetti,\* T. J. Marks\* “*Dithienosilole- and Dibenzosilole-Thiophene Copolymers as Semiconductors for Organic Thin-Film Transistors*” **Journal of the American Chemical Society**, 2006, *128*, 9034-9035. (IF = 13.86)  
(Highlighted by the "ACS: Chemical Innovation Heart Cut", August 21, 2006).

## AWARDS & HONORS

---

### **The Young Scientists Award (TÜBA-GEBİP), 2015**

The Turkish Academy of Sciences (TÜBA) in the field of Materials Science and Nanotechnology

### **The Young Scientist of the Year, 2015**

Science Heroes Association (Bilim Kahramanları Derneği)

### **Distinguished Young Scientist Award (Bilim Akademisi-BAGEP), 2014**

Science Academy Association (Bilim Akademisi Derneği) in the field of Materials Science and Nanotechnology

### **TUBITAK-Career Reintegration Grant, 2013**

The Scientific Research Council of Turkey (TUBITAK), Ankara, Turkey

### **Flexi R&D Award, FlexTech Alliance, USA, 2011**

As Polyera R&D Team for World-Class Research and Material Development for Printed Electronics

### **IDTechEx Printed Electronics Europe Award, Germany, 2010**

As Polyera R&D Team for Best Organic Materials Development

### **US National Institute of Standards and Technology (NIST) Innovation Award, USA, 2010**

As Polyera R&D Team for Organic Photovoltaic Materials Development

### **Conference Travel Grant, 2007-2008**

Graduate School, Northwestern University, USA

### **Allen S. Hussey Award, 2006**

Organic Chemistry Division, Northwestern University, USA

### **Graduate School Full Scholarship (Stipend + Tuition), 2004-2008**

Chemistry Department, Weinberg College of Arts and Science, Northwestern University, USA

### **NSF-REU Scholarship, 2002**

Texas A&M University, College Station, TX, USA

### **TUBITAK Scholarship for Undergraduate Education, 2000 - 2004**

The Scientific Research Council of Turkey



**Full (Tuition+Housing+Stipend) Undergraduate Scholarship, 2000 - 2004**

Department of Chemistry, Bilkent University, Ankara, Turkey

**PROFESSIONAL AFFILIATIONS**

---

**Academic Society Affiliations:**

American Chemical Society (ACS)

Materials Research Society (MRS)

Royal Society of Chemistry (RSC)

Phi Lambda Upsilon Society of Northwestern University (Honorary Member)

**Regularly refereeing manuscripts for scientific journals and grants:**

- Journal of Materials Chemistry A/B/C, Macromolecules, Chemistry of Materials, RSC Advances, Energy and Environmental Science, SoftMatter, Chemical Communications, Journal of Physical Chemistry, Physical Chemistry Chemical Physics, International Journal of Analytical Chemistry, Dyes and Pigments, Polymers and IEEE Transactions on Nanotechnology.
- TÜBİTAK-ARDEB, TEYDEP Projects
- American National Science Foundation (NSF) Grants

**PRESENTATIONS & LECTURES & CONFERENCES**

---

1. (Invited Talk) “High Performance Functional Organic Materials for use in Optoelectronics” **Physics Department Seminar**, September 2017, *Eskişehir, Turkey*.
2. (Invited Talk) "Molecular Engineering Approaches for Optoelectronic Materials” **International Congress on Chemistry and Materials Science**, October 2017, *Ankara, Turkey*.
3. (Invited Talk) “Molecular Engineering Approaches to High Performance Materials in Organic Optoelectronics” **Turkish Academy of Sciences GEBIP Meeting**, September 2017, *Erzurum, Turkey*.
4. (Talk) “Development of Solution Processed BODIPY-based Semiconducting Microfibers and Microribbons for Organic Thin Film Transistors” **European Materials Research Society (MRS) Conference**, May 2017, *Strasbourg, France*.
5. (Invited Talk) "Development of Functional Organic Materials for High-Performance Ambipolar OFETs" **28th National Chemistry Conference**, August 2016, *Mersin, Turkey*.
6. (Talk) “Design, Synthesis and Characterization of Novel Ambipolar Semiconductors. Improvement of Charge Carrier Mobilities via Alkyl Chain Tailoring” **The International Conference on Material Science and Technology in Cappadocia (IMSTEC 2016)**, April 2016, *Turkey*.
7. (Invited Talk) “Design and Development of Functional Organic Small Molecules and Polymers for Optoelectronics” **251st American Chemical Society Meeting**, March 2016, *San Diego, USA*.
8. (Invited Talk) “Ambipolar Materials for High-Performance Organic Thin-Film Transistors” **Middle East Technical University (METU), Chemistry Department**, December 2015, *Ankara, Turkey*.
9. (Talk) "Ambipolar Small Molecule Design and Synthesis" **International NanoNG-2015 (Nanoscience and Nanotechnology for Next Generation) Conference**, October 2015, *Kemer, Antalya, Turkey*.
10. (Talk) "Development of Novel Boron-Based Polymers Semiconductors for Organic Field-Effect Transistors" **International Semiconductor Science and Technology Conference (ISSTC-2015)**, May 2015, *Kuşadası, Aydın*.

11. (Invited Talk) "Thiazole-Thiophene Based Oligomers for Next Generation OFET and OLET Applications" **5<sup>th</sup> National Inorganic Chemistry Conference**, April 2015, *Mersin, Turkey*.
12. (Invited Talk) "Materials Design Strategies for High Performance Organic Optoelectronic Semiconductors" **International Organic Electronic Material Technologies (OEMT-2015) Conference**, March 2015, *Elazığ, Turkey*.
13. "Development of Novel Polymer Semiconductors for Organic Thin-Film Transistors" **6<sup>th</sup> International Conference on Nanomaterials - Research & Application**, November 2014, *Brno, Czech Republic*.
14. "Optical Manipulation and Chemical Enhancement of Transparent Metal Nanowire Films" **International NanoNG-2014 (Nanoscience and Nanotechnology for Next Generation) Conference**, August 2014, *Elazığ, Turkey*.
15. "Design, Synthesis, and Characterization of Novel Polymeric Ambipolar Semiconductors for Organic Field-Effect Transistors" **International NanoNG-2014 (Nanoscience and Nanotechnology for Next Generation) Conference**, August 2014, *Elazığ, Turkey*.
16. "High-Performance Organic Materials for Flexible Optoelectronics" **International Workshop on Flexible Bio- and Organic Printed Electronics**, May 2014, *Konya, Turkey*.
17. (Invited Talk) "Materials Development for High-Performance Organic Optoelectronic Applications" **Bilkent University, UNAM-National Nanotechnology Research Center**, March 2014, *Ankara, Turkey*.
18. "Electrodeposition of novel poly (naphthalenediimide-quaterthiophene) thin films and applications in plastic optoelectronics devices" 15th International Conference on Transparent Optical Networks (ICTON), June 2013, *Cartagena, Spain*.
19. (Invited Talk) "Technology Portfolio for Novel Optoelectronic Devices" **7<sup>th</sup> COPE-SOLVAY Symposium on Organic Electronics**, May 2013, *Bordeaux, France*.
20. "Materials Development for High-Performance Organic Optoelectronic Applications", Lecture, April 2013, **Abdullah Gül University**, Kayseri, Turkey.
21. "Organic Semiconductor Materials Design for High-Performance Optoelectronic Applications", Lecture, April 2013, **Sabancı University**, Istanbul, Turkey.
22. (Invited Talk) "High-Performance Organic Materials for Optoelectronics", Lecture, April 2013, **Tubitak Marmara Research Center/UME**, Gebze, Turkey.
23. (Invited Paper) "Materials Development for Flexible Displays" **Active-Matrix Flatpanel Displays and Devices (AM-FPD)**, *Kyoto, Japan*, 2012, 63-66.
24. (Invited Paper) "Molecular and polymeric materials for printed organic photovoltaics" **SPIE Optics and Photonics, Organic Photovoltaics XIII**, Volume 8477, 8477-8 pp, August 2012, *San Diego, CA*.
25. (Invited Talk) "Nanoscope Materials for Organic Photovoltaic and Transistors Applications." **Materials Research Society (MRS) Fall Meeting (Symposium E: Molecular and Hybrid Materials for Electronics and Photonics)**, December 2010, *Boston, MA*.
26. **International Institute for Nanosymposium**, November 2010, *Evanston, IL*.
27. (Invited Talk) "Design, Synthesis and Characterization of Novel Organic Semiconductors for High Performance Organic Field-Effect Transistors: A Bright Future for Plastic Electronics." **Institute of Materials Science and Nanotechnology**, July 2010, *Bilkent University, Ankara, Turkey*.

28. (Invited Paper) **H. Usta**, A. Facchetti,\* T. J. Marks\* “*Electron-Transporting Materials for Printed Electronics*” **Materials Research Society, Organic and Hybrid Materials for Large-Area Functional Systems**. 2009, 1114-1118.
29. “Air-Stable, Solution-Processable *n*-Channel and Ambipolar Semiconductors for Thin-Film Transistors Based on the Indenofluorenebis(dicyanovinylene) Core.” **Gordon Research Conferences**, July 2008, *South Hadley, MA*.
30. “Synthetic Approaches to New Electron-Deficient Building Blocks for N-channel Organic Transistors.” **Materials Research Society (MRS) Spring Meeting (Conjugated Organic Materials--Synthesis, Structure, Device, and Applications)**, March 2008, *San Francisco, CA*.
31. “Dithienosilole- and Dibenzosilole-Thiophene Copolymers as Semiconductors for Organic Thin-Film Transistors.” **Industrial Associates Meeting**, March 2007, *Evanston, IL*.
32. “Silole-based Polymeric Semiconductors for Organic Thin-Film Transistors.” **233<sup>rd</sup> ACS National Meeting**, March 2007, *Chicago, IL*.
33. “Highly Soluble and Electron-Deficient Ladder-type (Bis)Indenofluorene building blocks for n-channel semiconductors for OFETs.” **Northwestern University Fall BIP Lectures**, December 2007, *Northwestern University, Evanston, IL*.
34. Synthesis and Characterization of Electron-Deficient Monomers and Polymers as Air-Stable Semiconductors for OFETs.” **Departmental Seminar in Organic Chemistry**, November 2007, *Northwestern University, Evanston, IL*.
35. “Silole-based Polymeric Semiconductors for OFETs.” **Northwestern University Winter BIP Lectures**, February 2007, *Northwestern University, Evanston, IL*.
36. “Synthesis and Characterization of AreneSilole-Thiophene Copolymers as New Semiconductors for Organic Thin-Film Transistors.” **38th Central Regional Meeting of the American Chemical Society**, May 2006, *Frankenmuth, MI*.
37. “Investigation of the Polaron Formation in a Donor-acceptor System: TTP-Pyrrole (1:2) Copolymer.” **Senior Research Seminar at Bilkent University**, May 2004, *Ankara, Turkey*.
38. “Synthesis of a Truncated Pateamine A Derivative via a mediated ring-opening reaction.” **NSF-Research Experience for Undergraduates Final Seminar**, August 2002, *Texas A&M University, College Station, TX*.