

# ADAM PHILLIP WILLARD

## Curriculum Vitae

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### **Education:**

- 2009 Ph.D., Chemistry, University of California, Berkeley  
Thesis Advisor, Prof. David Chandler
- 2003 B.S., Chemistry and Mathematics, University of Puget Sound

### **Employment:**

- 2013-Present Assistant Professor, Massachusetts Institute of Technology, Department of Chemistry
- 2010-2013 Postdoctoral Fellow, Department of Chemistry, University of Texas at Austin, Supervised by Prof. Peter Rossky
- 2009-2010 Postdoctoral Fellow, Lawrence Berkeley National Laboratory, Supervised by Prof. David Chandler

### **Honors and Awards:**

- 2016 NSF CAREER
- 2016 Cottrell Scholar
- 2017 Scialog Fellow: Advanced Energy Storage

### **Independent Publications:**

1. M. R. Golder, Y. Jiang, P. E. Teichen, H. V.-T. Nguyen, W. Wang, N. Milos, S. A. Freedman, A. P. Willard, J. A. Johnson, "Stereochemical Sequence Dictates Unimolecular Diblock Copolymer Assembly", *J. Am. Chem. Soc.* (2018). (*accepted*)
2. S. Shin and A. P. Willard, "Characterizing Hydration Properties Based on the Orientational Structure of Interfacial Water Molecules", *J. Chem. Theo. Comp.* (2017). (*accepted*)
3. F. S. Freyria, J. Cordero, J. Caram, S. Doria, A. Dodin, A. P. Willard, and M. Bawendi "Near-Infrared Quantum Dot Emission Enhanced by Stabilized Self-Assembled J-Aggregate Antennas", *Nano Lett.*, **17**(12), 7665-7674, (2017).
4. L. Shi, C. K. Lee, and A. P. Willard, "The Enhancement of Interfacial Exciton Dissociation by Energetic Disorder is a Nonequilibrium Effect", *ACS Cent. Sci.*, **3**(12),1262-1270, (2017).
5. A. J. Goodman, A. P. Willard, and W. A. Tisdale, "Exciton trapping is responsible for the long apparent lifetime in acid-treated MoS<sub>2</sub>", *Phys. Rev. B.*, **96**, 121404, (2017).

6. J. A. Kattirtzi, D. T. Limmer, and A. P. Willard, "Microscopic dynamics of charge separation at the aqueous electrochemical interface", *Proc. Nat. Acad. Sci.*, **114**, 13374-13379, (2017).
7. E. M. Y. Lee, A. J. Mork, A. P. Willard, and W. A. Tisdale, "Including surface ligand effects in continuum elastic models of nanocrystal vibrations", *J. Chem. Phys.*, **147**, 044711, (2017).
8. R.H. Gilmore, E.M.Y. Lee, M.C. Weidman, A.P. Willard, and W.A. Tisdale, "Charge Carrier Hopping Dynamics in Homogeneously Broadened PbS Quantum Dot Solids", *Nano Letters*, **17**, 893-901, (2017).
9. A.J. Mork, E.M.Y. Lee, N.S. Dahod, A.P. Willard, and W.A. Tisdale, "Modulation of Low-Frequency Acoustic Vibrations in Semiconductor Nanocrystals through Choice of Surface Ligand", *J. Phys. Chem. Lett.*, **7**, 4213-4216, (2016).
10. A.V. Zhukhovitskiy, J. Zhao, M. Zhong, E.G. Keeler, E.A. Alt, P.E. Teichen, R.G. Griffin, M.J. Hore, A.P. Willard, J.A. Johnson, "Polymer Structure Dependent Hierarchy in PolyMOC Gels", *Macromolecules*, **49**, 6896-6902, (2016).
11. C. K. Lee, L. Shi, and A.P. Willard, "A Model of Charge Transfer Excitons: Diffusion, Spin Dynamics, and Magnetic Field Effects", *J. Phys. Chem. Lett.*, **7**, 2246-2251, (2016).
12. A.V. Zhukhovitskiy, M. Zhong, E.G. Keeler, V.K. Michaelis, J.E.P. Sun, M.J. A. Hore, D.J. Pochan, R.G. Griffin, A.P. Willard, J.A. Johnson, "High branch functionality and loop-rich polymer metal-organic cage gels." *Nature Chemistry*, **8**, 33-41, (2016).
13. P. B. Deotare, W. Chang, E. Hontz, D. N. Congreve, L. Shi, P. D. Reusswig, B. Modtland, M. E. Bahlke, C. K. Lee, A. P. Willard, V. Bulović, T. Van Voorhis, and M. A. Baldo, "Nanoscale transport of charge transfer states in organic donor-acceptor blends." *Nature Materials*, **14**, 1130-1134, (2015).
14. B. Reeja-Jayan, N. Chen, J. Lau, J.A. Kattirtzi, P. Moni, A. Liu, I.G. Miller, R. Kayser, A.P. Willard; B. Dunn; K.K. Gleason, "A group of cyclic siloxane and silazane polymer films as nanoscale electrolytes for microbattery architectures." *Macromolecules*, **48**(15), 5222-5229, (2015).
15. E.M.Y. Lee, W.A. Tisdale, and A.P. Willard, "Can disorder enhance incoherent exciton diffusion?" *J. Phys. Chem. B*, **119**, 9501-9509, (2015).
16. A.P. Willard, "Illuminating the Interactions between Small Solutes in Liquid Water." *J. Phys. Chem. Lett.*, **6**(9), 1616-1617, (2015).
17. D.T. Limmer and A.P. Willard, "Nanoscale heterogeneity at the aqueous electrolyte-electrode interface," *J. Chem. Phys. Lett.*, **620**, 144-150, (2015).
18. G.M. Akselrod, F. Prins, L.V. Poulidakos, E.M.Y. Lee, M.C. Weidman, A.J. Mork, A.P. Willard, V. Bulović, and W.A. Tisdale, "Subdiffusive Exciton Transport in Quantum Dot Solids," *Nano Lett.*, **14**(6), 3556-3562, (2014).

**Publications Prior to Independent Career:**

19. P. Varilly, A. P. Willard, J. B. Kirkegaard, T. P. J. Knowles, and D. Chandler "Intra-chain organisation of hydrophobic residues controls inter-chain aggregation rates of amphiphilic polymers", *J. Chem. Phys.*, **146**, 135102, (2017).
20. D.T. Limmer, A.P. Willard, P.A. Madden, and D. Chandler, "Water Exchange at a Hydrated Platinum Electrode Is Rare and Collective", *J. Phys. Chem. C*, (submitted), 2015.

21. Z. Hu, A.P. Willard, R.J. Ono, C.W. Bielawski, P.J. Rossky and D.A. Vanden Bout, "The nature of interchain excited states in polythiophene: excitonic vs. charge-transfer character." *Nature Communications*, (accepted), 2015.
22. A.P. Willard and D. Chandler, "The molecular structure of the interface between water and a hydrophobic substrate is liquid-vapor like," *J. Chem. Phys.* **141**(18), 18C519, (2014).
23. A.P. Willard, D.T. Limmer, P.A. Madden, and D. Chandler, "Characterizing heterogeneous dynamics at hydrated electrode surfaces," *J. Chem. Phys.*, **138**, 184702, (2013).
24. D.T. Limmer, A.P. Willard, P.A. Madden, and D. Chandler, "Hydration of metal surfaces can be dynamically heterogeneous and hydrophobic," *Proc. Nat. Acad. Sci.*, **110**, 4200-4205, (2013).
25. A.E. Jailaubekov, A.P. Willard, J.R. Tritsch, W.-L. Chan, N. Sai, R. Gearba, L.G. Kaake, K.J. Williams, K. Leung, P.J. Rossky, and X.-Y. Zhu, "Hot Charge Transfer Excitons Set the Time Limit for Charge Separation at Donor/Acceptor Interfaces in Organic Photovoltaics," *Nature Mat.*, **12**, 66-73, (2012).
26. R. Vacha, O. Marsalek, A.P. Willard, D.J. Bonthuis, R.R. Netz, and P. Jungwirth, "Charge Transfer between Water Molecules As the Possible Origin of the Observed Charging at the Surface of Pure Water," *J. Phys. Chem. Lett.*, **3**, 107-111, (2012).
27. A.P. Willard, and D. Chandler, "Instantaneous Liquid Interfaces," *J. Phys. Chem. B*, **114**, 1954-1958, (2010).
28. A.P. Willard, S.K. Reed, P.A. Madden, and D. Chandler, "Water at an Electrochemical Interface--a Simulation Study," *Faraday Discussion*, **141**, 423-441, (2009).
29. A.P. Willard, and D. Chandler, "Coarse Grained Modeling of the Interface Between Water and Heterogeneous Surfaces," *Faraday Discussion*, **141**, 209-220, (2009).
30. A.P. Willard, and D. Chandler, "The Role of Solvent Fluctuations in Hydrophobic Assembly," *J. Phys. Chem. B*, **112**, 6187-6192, (2008).