Curriculum Vitae

Yoon Hwa
Arizona State University
School of Electrical, Computer and Energy Engineering
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PROFESSIONAL EXPERIENCE

Assistant Professor, *Arizona State University* (*ASU*), USA	Aug. 2020 –
Specialist, *University of California Berkeley* (*UC Berkeley*), USA	2019 – 2020
Postdoctoral Fellow, *Lawrence Berkeley National Laboratory*, (*LBNL*), USA	2015 – 2018
Postdoctoral Scholar, *UC Berkeley*, USA	2014

EDUCATION

Ph.D. in Materials Science & Engineering	2013
Seoul National University (*SNU*), South Korea	
B.S. in Advanced Materials Science and Engineering	2007
Sungkyunkwan University, South Korea	

RESEARCH INTERESTS

I am broadly interested in materials' and device' development for energy storage and conversion systems such as electrochemical rechargeable batteries and solar cells. My research plans are shaped by the emerging trend towards laser-based manufacturing processes that focus on the question of how best to synthesize functional composite materials or to construct rationally designed device architectures in order for enhancing capabilities relevant to energy and sustainability. Using superior capability of advanced laser-based manufacturing for controlling the material and device geometry, I pursue radical improvement of the performance of energy storage and conversion systems to achieve affordable energy for our society.

AWARDS AND SCHOLARSHIPS

6. International Society of Electrochemistry (*ISE*) Travel Award for Young Electrochemists (*ISE*, 2017)
5. Spot Award (*LBNL*, 2017)
4. Lecture & Research Scholarship (*SNU*, 2009-2012)
3. Scholarships Granted by the College of Engineering (*SNU*, 2008)
2. Superior Academic Performance Scholarship (*SNU*, 2008)
1. Brain Korea 21 Scholarship, (*SNU*, 2007)

PUBILICATION LIST

36. Y. Hwa & T. M. Devine*, *Preferential pitting corrosion behavior of laser surface melt 316 stainless steel in hydrochloric acid solution*, **Manuscript in preparation**.

35. **Y. Hwa**, C. S. Kumai, T. M. Devine*, N. Yang, J. Yee, R. Hardwick & K. Burgman, *Microstructure of Directed Energy Deposition-Additively Manufactured 316L Stainless Steel*, **Submitted to J. Mater. Sci. Technol.**, In Review.

34. K.-H. Nam, **Y. Hwa** & C.-M. Park*, *Zinc–Phosphides as outstanding sodium-ion battery anodes*, **J. Appl. Mater. Inter.**, 12, (2020) 15053-15062. Link

33. H. K. Seo[§], **Y. Hwa**[§], J. H. Chang, J. Y. Park, J. S. Lee, E. J. Cairns* & J. Yuk*, *Direct visualization of lithium polysulfides and their suppression in liquid electrolyte*, **Nano Lett.**, 20, (2020) 2080-2086. [§]These authors contributed equally to this work. Link

32. **Y. Hwa**[§], H.-W. Kim[§], H. Shen, D. Y. Parkinson, B. D. McCloskey & E. J. Cairns*, *Sustainable sulfur-carbonaceous composite electrode toward high specific energy rechargeable cells*, **Mater. Horiz.**, 7, (2020) 524-529. [§]These authors contributed equally to this work. Link

31. D. Sun, **Y. Hwa**, L. Zhang, J. Xiang, J. Guo, Y. Huang & E. J. Cairns*, *High lithium sulfide loading electrodes for practical Li/S cells with high specific energy*, **Nano Energy**, 64, (2019) 103891. Link

30. **Y. Hwa**[§], E. Yi[§], H. Shen, Y. Sung, J. Kou, K. Chen, D. Y. Parkinson, M. Doeff* & E. J. Cairns*, *Three-dimensionally aligned sulfur electrodes by directional freeze tape casting*, **Nano Lett.**, 19, (2019) 4731-4737. [§]These authors contributed equally to this work. Link

29. **Y. Hwa** & E. J. Cairns*, *Polymeric binders for the sulfur electrode compatible with ionic liquid containing electrolytes*, **Electrochim. Acta**, 271, (2018) 103-109. Link

28. **Y. Hwa**, P. D. Frischmann, B. A. Helms* & E. J. Cairns*, *Aqueous-processable redox-active supramolecular polymer binders for advanced lithium/sulfur cells*, **Chem. Mater.**, 30, (2018) 685-691. Link

27. **Y. Hwa,** H. K. Seo, J.-M. Yuk & E. J. Cairns*, *Freeze-dried sulfur-graphene oxide-carbon nanotube nano-composite for high sulfur loading lithium/sulfur cells*, **Nano Lett.**, 17, (2017) 7086-7094. Link

26. P. D. Frischmann[§], **Y. Hwa**[§], E. J. Cairns* & B. A. Helms*, *Supramolecular perylene bisimide polymer nanowires as redox-active binders for lithium-sulfur batteries*, **Chem. Mater.**, 28, (2016) 7414-7421. [§]These authors contributed equally to this work. Link

25. D. Sun, **Y. Hwa**, Y. Shen*, Y. Huang* & E. J. Cairns*, *Li_2S nano spheres anchored to single-layered graphene as a high-performance cathode material for lithium/sulfur cells*, **Nano Energy**, 26, (2016) 524-532. Link

24. **Y. Hwa**, J. Zhao & E. J. Cairns*, *Lithium sulfide (Li_2S)/graphene oxide nano-spheres with conformal carbon coating as high-rate, long-life cathode for Li/S cells*, **Nano Lett.**, 15, (2015) 3479-3486. Link

23. B.-C. Yu, **Y. Hwa**, J.-H. Kim* & H.-J. Sohn, *Carbon coating for Si nanomaterials as high-capacity lithium battery electrodes*, **Electrochem. Commun.**, 46, (2014) 144-147. Link

22. W.-S. Kim, **Y. Hwa**, H.-C. Kim, J.-H. Choi, H.-J. Sohn & S.-H. Hong*, *SnO_2@Co_3O_4 hollow nano-spheres for a Li-ion battery anode with extraordinary performance*, **Nano research**, 7, (2014) 1128-1136. Link

21. B.-C. Yu, **Y. Hwa**, J.-H. Kim & H.-J. Sohn*, *Characterizations and electrochemical behaviors of milled Si with a degree of amorphization and its composite for Li-Ion batteries*, **J. Power Sources**, 260, (2014) 174-179. Link

20. **Y. Hwa**, W.-S. Kim, B.-C. Yu, J.-H. Kim, S.-H. Hong & H.-J. Sohn*, *Facile synthesis of Si nanoparticles using magnesium silicide reduction and its carbon composite as a high-performance anode for Li ion batteries*, **J. Power Sources**, 252, **(**2014) 144-149. Link

19. W.-S. Kim, **Y. Hwa**, J.-H. Shin, M. Yang, H.-J. Sohn & S.-H. Hong*, *Scalable synthesis of silicon nanosheets from sand as an anode for Li-ion batteries*, **Nanoscale**, 6, **(**2014) 4297-4302. Link

18. B.-C. Yu, **Y. Hwa**, J.-H. Kim & H.-J. Sohn*, *A new approach to synthesis of porous SiO_x anode for Li-ion batteries via chemical etching of Si crystallite*, **Electrochim. Acta**, 117, (2014) 426-430. Link

17. **Y. Hwa**, W.-S. Kim, B.-C. Yu, J.-H. Kim, S.-H. Hong & H.-J. Sohn*, *Facile synthesis of Si/TiO_2(anatase) core-shell nanostructured anode for rechargeable Li-ion batteries*, **J. Electroanal. Chem.**, 712, **(**2014) 202-206**.** Link

16. **Y. Hwa**, W.-S. Kim, B.-C. Yu, S.-H. Hong & H.-J. Sohn*, *Mesoporous nano-sized Si anode for Li-ion batteries produced by magnesio-mechanochemical reduction of amorphous SiO_2 for Li-ion batteries*, **Energy Tech.**, 1, (2013) 327-331. Link

15. **Y. Hwa**, W.-S. Kim, B.-C. Yu, S.-H. Hong & H.-J. Sohn*, *Enhancement of the cyclability of Si anode through Co_3O_4 coating by the sol-gel method*, **J. Phys. Chem. C**, 117, (2013) 7013-7017. Link

14. B.-C. Yu, **Y. Hwa,** C.-M. Park & H.-J. Sohn*, *Effect of oxide layer thickness to nano-Si anode for Li-Ion batteries*, **RSC Adv.**, 3, (2013) 9408-9413. Link

13. B.-C. Yu, **Y. Hwa**, C.-M. Park & H.-J. Sohn*, *Reaction mechanism and enhancement of cyclability of SiO anode by surface etching with NaOH for Li-Ion Batteries*, **J. Mater. Chem. A**, 1, (2013) 4820-4825. Link

12. **Y. Hwa**, W.-S. Kim, B.-C. Yu, H.-S. Kim, S.-H. Hong & H.-J. Sohn*, *Reversible storage of Li-ion in nano-Si/SnO_2 core-shell nanostructured electrode*, **J. Mater. Chem. A**, 1, (2013) 3733-3738. Link

11. W.-S. Kim, **Y. Hwa**, H.-J. Sohn & S.-H. Hong*, *Synthesis of SnO_2 nano hollow spheres and their size effects in lithium ion battery anode application*, **J. Power Sources**, 225, (2013) 108-112. Link

10. M. Kim, J.-W. Kim, M.-S. Sung, **Y. Hwa**, S. H. Kim & H.-J. Sohn*, *Si nanocrystallites embedded in hard $TiFeSi_2$ matrix as an anode material for Li-ion batteries*, **J. Electroanal. Chem.**, 689, (2012) 84-88. Link

9. **Y. Hwa**, C.-M. Park, and H.-J. Sohn*, *Modified SiO as a high performance anode for Li-ion batteries*, **J. Power Sources**, 222, (2013) 129-134. Link

8. **Y. Hwa**, J.-H. Sung, B. Wang, C.-M. Park & H.-J. Sohn*, *Nanostructured Zn-based composite anodes for rechargeable Li-ion batteries*, **J. Mater. Chem.**, 22, (2012) 12767-12773. Link

7. **Y. Hwa**, W.-S. Kim, S.-H. Hong & H.-J. Sohn*, *High capacity and rate capability of core-shell structured nano-Si/C anode for Li-ion batteries*, **Electrochim. Acta**, 71, (2012) 201-205. Link

6. **Y. Hwa**, C.-M. Park & H.-J. Sohn*, *The electrochemical characteristic of Ag_2S and its nanocomposite anodes for Li-ion batteries*, **J. Electroanal. Chem.**, 667, (2012) 24-29. Link

5. H. Jung, Y.-U. Kim, M.-S. Sung, **Y. Hwa**, G. Jeong, G.-B. Kim & H.-J. Sohn*, *Nanosize Si anode embedded in super-elastic nitinol (Ni-Ti) shape memory alloy matrix for Li rechargeable batteries*, **J. Mater. Chem.**, 21, (2011) 11213-11216. Link

4. J.-M. Lee, H. Jung, **Y. Hwa**, H. Kim, D. Im, S.-G. Doo & H.-J. Sohn*, *Improvement of electrochemical behavior of Sn_2Fe/C nanocomposite anode with Al_2O_3 addition for lithium-ion batteries*, **J. Power Source**, 195, (2010) 5044-5048. Link

3. C.-M. Park, W. Choi, **Y. Hwa**, J.-H. Kim, G. Jeong, & H.-J. Sohn*, *Characterizations and electrochemical behaviors of disproportionated SiO and its composite for rechargeable Li-ion batteries*, **J. Mater. Chem.**, 20, (2010) 4854-4860. Link

2. C.-M. Park, **Y. Hwa**, N.-E. Sung & H.-J. Sohn*, *Stibnite (Sb_2S_3) and its amorphous composite as dual electrodes for rechargeable lithium batteries*, **J. Mater. Chem.**, 20, (2010) 1097-1102. Link

1. **Y. Hwa**, C.-M. Park & H.-J. Sohn*, *The effect of Cu addition on Ge-based composite anode for Li-ion batteries*, **Electrochim. Acta**, 55, (2010) 3324-3329. Link

PATENTS

2. P. D. Frischmann, **Y. Hwa**, E. J. Cairns & B. A. Helms, *Composite battery electrodes containing supramolecular polymer binders*, **US patent application filed**, Application number: 15/467,099.

1. **Y. Hwa** & E. J. Cairns, *Lithium sulfide-graphene oxide composite material for Li/S cells*, **International patent application filed**: **US, KR, JP, CN, EP, WO.**

BOOK CHAPTERS

3. **Y. Hwa** & E. J. Cairns*, '*Nano-structured Sulfur and Sulfides for Advanced Lithium Sulfur Cells'* in the book entitled *'Science of Nanomaterials (Tentative)'*, Ed. Suresh C. Ameta, Apple Academic Press, (2020) Submitted, **In Review.**

2. **Y. Hwa** & E. J. Cairns*, '*Sulfur cathode'* in the book entitled *'Li-S batteries: the challenges, chemistry, materials, and future perspectives'*, Ed. Rezan Demir-Cakan, World Scientific Publishing, (2017)

1. **Y. Hwa** & E. J. Cairns*, '*Li-ion batteries and beyond: future design challenges'* in the book entitled *'The lightest metals: science and technology from lithium to calcium'*, Ed. Timothy P. Hanusa, Encyclopedia of Inorganic and Bioinorganic Chemistry, John Wiley & Sons, (2015)

SELECTED PRESENTATIONS

Full presentation list available on request

7. T. M. Devine, **Y. Hwa,** J. K. Yee & N. Y. Yang, *Microstructure of additively manufactured and laser melted 316L stainless steel*, TMS 2020 149th Annual Meeting and Exhibition. **Oral Presentation**

6. **Y. Hwa** & T. M. Devine, *Microstructure of Additively Manufactured 316L Stainless Steel*, Molecular Foundry Inorganic Facility Seminar, **Invited Speaker**, Nov. 2019.

5. **Y. Hwa**, *Rational design of sulfur-graphene oxide based electrode enabling high specific energy lithium/sulfur Cell*, 14th Annual Lithium Battery Materials & Chemistries, **Invited Speaker**, Nov. 2018.

4. **Y. Hwa** & E. J. Cairns, *Li/S cells with cetyltrimethylammonium bromide modified sulfur-graphene oxide-carbon nanotube electrodes*, The International Society of Electrochemistry, Aug. 2017, **Invited Speaker**.
3. **Y. Hwa,** P. D. Frischmann, B. A. Helms & E. J. Cairns, *Redox-active supramolecular polymer binders for advanced lithium/sulfur cells*, Molecular Foundry User Meeting, 2017, **Invited Speaker**.
2. **Y. Hwa** & E. J. Cairns, *High sulfur loading electrodes toward practical Li/S cells,* American Chemical Society Spring Meeting, Apr. 2017, **Oral Presentation**.
1. **Y. Hwa** & E. J. Cairns, *Nanostructured Li_2S-carbonaceous composite electrode for next-generation lithium cells*, Next-Generation Energy Storage, Mar. 2016, **Invited Speaker**.
*16 presentations at the universities and the national laboratories as an invited speaker since 2019.
**10+ presentations (Oral and Poster) from 2007 to 2017.

PROFESSIONAL SOCIETY ACTIVITIES

Co-organizing the Symposium on 3-D Printing of Battery

The Electrochemical Society PRiME 2020 Meeting

Memberships

American Chemical Society; *Electrochemical Society*; *International Society of Electrochemistry*; *Material Research Society.*

Referee Activities

Peer-reviewed 90+ manuscripts submitted to the international scientific journals.