

# Ju-Won Jeon

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## **EDUCATION**

**Ph.D.** candidate in Chemical Engineering (Aug. 2010 ~ Dec. 2014)

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

Advisor: Professor Jodie L. Lutkenhaus

**M.S.** in Chemical and Biomolecular Engineering (Aug. 2007 ~ Aug. 2009)

**Korea Advanced Institute of Science & Technology (KAIST)**, Daejeon, South Korea

Advisor: Professor Son-Ki Ihm

**B.S.** in Chemical Engineering (2007)

**Sogang University**, Seoul, Korea

## **RESEARCH INTEREST**

Energy storage systems, electrochemistry, polymers, layer-by-layer assembly, self-assembly, conducting polymers, graphene, carbon nanotubes, nanostructured materials, metal-organic frameworks, carbonaceous materials, inorganic porous materials, organic-inorganic hybrid materials, nanoparticles, catalysis.

## **RESEARCH EXPERIENCE**

**Nanostructured polyaniline nanofiber/electrochemically reduced graphene oxide multilayer electrodes for energy storage.**

- Nanostructured polyaniline nanofiber/graphene electrodes were fabricated using dip and spray layer-by-layer assembly without a toxic reducing agent.
- It showed excellent electrochemical performances in terms of capacity, specific energy, specific power and cycle life.

**Lignin-derived nanoporous carbon for supercapacitor applications**

- Porous carbons were synthesized from low-cost renewable lignin sources using direct carbonization and applied for supercapacitor without an additional activation agent.
- We found that molecular weight is a critical factor to obtain high surface area porous carbons.

**In situ one-step synthesis of hierarchical nitrogen-doped porous carbon for high performance supercapacitors**

- Isostructural metal-organic frameworks were synthesized and carbonized to produce nitrogen-doped porous carbon.
- Nitrogen-doped porous carbons had superior electrochemical performances because of

additional pseudocapacitance and enhanced electrode/electrolyte interaction.

#### **Polyaniline nanofiber/vanadium pentoxide layer-by-layer electrodes for energy storage**

- Porous polyaniline nanofiber/vanadium pentoxide electrodes were fabricated using dip and spray layer-by-layer assembly.
- The porous electrodes had higher electrochemical performances than analogous nonporous electrodes due to enhanced ion/electron transport.

#### **Electric-field-induced morphological transitions in polyelectrolyte multilayers**

- Porous structure in multilayer films was created by applying an electric-field.
- The porous structure can be controlled by varying exposing time to electric-field.

#### **Oxidatively stable polyaniline:polyacid electrodes for electrochemical energy storage**

- Polyacid-doped polyaniline was synthesized using template polymerization.
- Polyacid-doped polyaniline exhibited improved cycling stability as compared to polyaniline homopolymer due to the strong interaction between polyacid and polyaniline.

#### **SWNT/graphene hybrid for transparent electrodes**

- SWNT was directly dispersed using graphene oxide without an additional surfactant, and chemically reduced to produce SWNT/graphene hybrid.
- Graphene oxide can play a role of surfactant for SWNT dispersion.

#### **Continuous one-step synthesis of N-doped titania under supercritical and subcritical water conditions for photocatalytic reaction under visible light**

- Nitrogen-doped titania was prepared continuously by one-step synthetic method under supercritical condition.
- Nitrogen-doped titania exhibited enhanced photocatalytic activity under visible light due to reduced band gap.

### **PUBLICATIONS**

1. Se Ra Kwon<sup>+</sup>, **Ju-Won Jeon**<sup>+</sup>, Jodie L. Lutkenhaus, “Polyaniline nanofiber/electrochemically reduced graphene oxide sprayed layer-by-layer electrodes for energy storage” **RSC advances**, 2015, 5, 14994-15001 (<sup>+</sup>:These authors are equally contributing).

2. **Ju-Won Jeon**, Se Ra Kwon, Jodie L. Lutkenhaus, “Porous polyaniline nanofiber/electrochemically reduced graphene oxide layer-by-layer electrodes for energy storage” **Journal of Materials Chemistry A**, 2015, 3, 3757-2767. **(One of the most read articles in Journal of Materials Chemistry A in January 2015)**

3. **Ju-Won Jeon**, Libing Zhang, Dhrubojyoti D. Laskar, John P. Lemmon, Daiwon Choi, Manjula I. Nandasiri, Ali Hashmi, Jie Xu, Radha K. Motkuri, Carlos A. Fernandez, Jian Liu, Jodie L. Lutkenhaus, Melvin P. Tucker, Peter B. McGrail, Bin Yang\* and Satish K. Nune\*, “Controlling porosity in lignin-derived nanoporous carbon for supercapacitor applications”, **ChemSusChem**, 2015, 8, 428-432. **(Front cover featured, one of the most accessed articles for ChemSusChem in October 2014)**

4. Lin Shao, **Ju-Won Jeon** and Jodie L. Lutkenhaus, “Porous polyaniline nanofiber/vanadium pentoxide sprayed layer-by-layer electrodes for energy storage”, **Journal of Materials**

**Chemistry A**, 2014, 2, 14421-14428.

5. **Ju-Won Jeon**, Ronish Sharma, Praveen Meduri, Bruce W. Arey, Jodie L. Lutkenhaus, John P Lemmon, Praveen K. Thallapally, Manjula I. Nandasiri, Peter B. McGrail, Satish K. Nune, "In situ one-step synthesis of hierarchical nitrogen-doped porous carbon for high performance supercapacitors", **ACS Applied Materials & Interfaces**, 2014, 6, 7214-7222.

6. Jared F. Mike, Lin Shao, **Ju-Won Jeon**, and Jodie L. Lutkenhaus, "Charge storage in decyl and 3,6,9-trioxadecyl substituted poly(dithieno[3,2-b:2,3-d]pyrrole) electrodes", **Macromolecules**, 2014, 47, 79-88.

7. **Ju-Won Jeon**, Josh O'Neal, Lin Shao and Jodie L. Lutkenhaus, "Polyaniline-based layer-by-layer electrodes for energy storage", **ACS Applied Materials & Interfaces**, 2013, 5, 10127-10136.

8. **Ju-Won Jeon**, Yuguang Ma, Jared F. Mike, Perla B. Balbuena, and Jodie L. Lutkenhaus, "Oxidatively stable polyaniline:polyacid electrodes for electrochemical energy storage", **Physical Chemistry Chemical Physics**, 2013,15, 9654-9662.

9. Lin Shao, **Ju-Won Jeon** and Jodie L. Lutkenhaus, "Porous polyaniline nanofiber/vanadium pentoxide layer-by-layer electrodes for energy storage", **Journal of Materials Chemistry A.**, 2013, 1, 7648-7656.

10. Chungyeon Cho, **Ju-Won Jeon**, Jodie L. Lutkenhaus, and Nicole S. Zacharia, "Electric-field-induced morphological transitions in polyelectrolyte multilayers", **ACS Applied Materials & Interfaces**, 2013, 5, 4930-4936.

11. Lin Shao, **Ju-Won Jeon** and Jodie L. Lutkenhaus, "Polyaniline/vanadium pentoxide layer-by-layer electrodes for energy storage", **Chemistry of Materials**, 2012, 24, 181-189.

12. **Ju-Won Jeon**, Jeong-Rang Kim, and Son-Ki Ihm, "Continuous one-step synthesis of N-doped titania under supercritical and subcritical water conditions for photocatalytic reaction under visible light" **Journal of Physics and Chemistry of Solids**, 2010, 71, 608-611.

### **PRESENTATION**

**Ju-Won Jeon**, Satish K. Nune, Jodie L. Lutkenhaus, "In situ one-step synthesis of hierarchical nitrogen-doped porous carbon derived from metal-organic frameworks for supercapacitors", **2014 AICHE Fall meeting**, Atlanta, USA (11, 2014)

**Ju-Won Jeon**, Se Ra Kwon, Jodie L. Lutkenhaus, "Porous polyaniline nanofiber/graphene multilayer electrodes for energy storage", **2014 AICHE Fall meeting**, Atlanta, USA (11, 2014)

**Ju-Won Jeon**, Satish K. Nune, Jodie L. Lutkenhaus, "In situ one-step synthesis of hierarchical nitrogen-doped porous carbon for high performance supercapacitors", **2014 ACS Fall Meeting**, San Francisco, USA (08, 2014)

Se Ra Kwon, **Ju-Won Jeon**, Jodie L. Lutkenhaus, "Polyaniline/graphene multilayer films for structural energy and power", **2014 ACS Spring Meeting**, Dallas, USA (03, 2014)

**Ju-Won Jeon**, Josh O'Neal, Lin Shao and Jodie L. Lutkenhaus, "Polyaniline-based layer-by-layer electrodes for energy storage", **2014 ACS Spring Meeting**, Dallas, USA (03, 2014)

**Ju-Won Jeon**, Yuguang Ma, Jared F. Mike, Perla B. Balbuena, Jodie L. Lutkenhaus, “Oxidatively stable and water-processable polyaniline: Poly(2-acrylamido-2-methylpropane sulfonic acid) complexes for electrochemical energy storage”, **2013 ACS Spring Meeting**, New Orleans, USA (04, 2013)

Lin Shao, **Ju-Won Jeon**, and Jodie L. Lutkenhaus, “Polyaniline nanofiber/vanadium pentoxide layer-by-layer electrodes for energy storage” **2013 ACS Spring Meeting**, New Orleans, USA (04, 2013)

Jodie L. Lutkenhaus, **Ju-Won Jeon**, Jared Mike, Lin Shao, and Perla Balbuena, “New tricks for electrochemical energy storage using polyaniline and other conjugated polymers” **2013 ACS Spring Meeting**, New Orleans, USA (04, 2013)

Jodie L. Lutkenhaus, and **Ju-Won Jeon**, “Oxidatively stable, water-dispersible polyaniline derivatives for flexible energy storage”, **2012 AIChE Fall Meeting**, Pittsburgh, USA (10, 2012)

Lin Shao, **Ju-Won Jeon** and Jodie L. Lutkenhaus, “Polyaniline nanofiber/vanadium pentoxide layer-by-layer electrodes for energy storage” **2012 AIChE Fall Meeting**, Pittsburgh, USA (10, 2012)

Lin Shao, **Ju-Won Jeon** and Jodie L. Lutkenhaus, “Polyaniline/vanadium pentoxide layer-by-layer electrodes for energy storage” **2012 Material Research Society Spring Meeting**, San Francisco, USA (04, 2012)

**Ju-Won Jeon**, Lin Shao and Jodie L. Lutkenhaus, “Water-processable polyaniline:poly(2-acrylamido-2-methylpropane sulfonic acid) complexes for electrochemical energy storage,” **2012 Material Research Society Spring Meeting**, San Francisco, USA (04, 2012)

**Ju-Won Jeon**, Jeong-Rang Kim, and Son-Ki Ihm, “Continuous one-step synthesis of N-doped titania under supercritical and subcritical water conditions for photocatalytic reaction under visible light”, **2009 International Symposium on Intercalation Compounds**, Beijing, China (05, 2009)

**Ju-Won Jeon**, Jeong-Rang Kim, and Son-Ki Ihm, “Continuous synthesis of titania particles with high surface area and anatase phase under subcritical and supercritical conditions”, **The 21st International Symposium on Chemical Engineering**, Saga, Japan (12, 2008)

## **PROFESSIONAL EXPERIENCES**

Postdoctoral Research Fellow Feb. 2015 ~ present  
Georgia Institute of Technology

Ph.D. Internship May 2013 ~ Dec. 2013  
Pacific Northwest National Laboratory.

Research Assistant Dec. 2010 ~ Dec. 2014  
Texas A&M University

Teaching Assistant Sep. 2012 ~ Jan. 2013  
Polymer Engineering (Texas A&M University)

Teaching Assistant Jan. 2012 ~ May 2013  
Thermodynamics II (Texas A&M University)

Researcher Sep. 2009 ~ Jul. 2010  
Korea Institute of Science & Technology (KIST)

Teaching Assistant Feb. 2009 ~ Jul. 2009  
Molecular Chemical Reaction Engineering at Korea Advanced Institute of Science & Technology (KAIST)

### **HONORS**

Outstanding Performance Award at Pacific North West National Laboratory	Dec. 2013
Awarded <i>Magna Cum Laude</i> , Sogang University	Aug. 2007
Honors Scholarship (AA), Sogang University	Jun. 2006
Honors Scholarship (AA), Sogang University	Dec. 2006

### **TECHNICAL SKILLS**

Electrochemical measurements (galvanostatic, cyclic voltammetry, electrochemical impedance spectroscopy), layer-by-layer assembly, synthesis of conducting polymer, synthesis of graphene oxide and graphene, synthesis of metal-organic frameworks, X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), quartz crystal microbalance (QCM), Transmission electron microscopy (TEM), Fourier transform infrared spectroscopy (FTIR), UV-vis spectroscopy, zeta potential and dynamic light scattering, profilometer, ellipsometer, nitrogen adsorption/desorption measurement, X-ray diffraction measurement (XRD)

### **REFERENCES**

#### **Dr. Jodie L. Lutkenhaus**

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