

# Godwin Severa, PhD, MBA.

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## **EDUCATION**

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SHIDLER COLLEGE OF BUSINESS, UNIVERSITY OF HAWAI'I AT MĀNOA | Honolulu, HI

*Masters of Business Administration* | May 2014

DEPARTMENT OF CHEMISTRY, UNIVERSITY OF HAWAI'I AT MĀNOA | Honolulu, HI

*Doctor of Philosophy in Chemistry* | August 2010

Dissertation: *Development of Novel Borohydrides as Onboard Hydrogen Storage Materials.*

## **RESEARCH INTERESTS**

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- Design, synthesis and characterization of novel hydrogen storage materials.
- Design, syntheses and characterization of ionic liquids/molten salts and mixed metal compounds as sorbents for acidic gas separation.
- Chemical kinetics and thermodynamic studies of gas sorption processes.
- Application of ionic liquids and inorganic compounds in forward osmosis water purification and energy devices, such as, Li ion and Mg ion batteries.

## **RESEARCH EXPERIENCE**

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UNIVERSITY OF HAWAI'I AT MĀNOA: HAWAI'I NATURAL ENERGY INSTITUTE | Honolulu, HI

*Assistant Researcher* | August 2014 to present

- Managing a hydrogen and purification materials development research lab.
- Performing hydrogen storage materials development research.
- Performing acidic gas absorbent materials development research.
- Syntheses and characterization of modified magnesium boride hydrogen storage materials.
- Syntheses and characterization of metallo ionic liquids, ionic salts and mixed metal compounds with capability for acidic gas absorption.

*Materials Researcher* | January 2014 to August 2014

- Developed a stable activated carbon supported ionic liquid absorbent for SO<sub>2</sub> capture.

*Postdoctoral Fellow* | August 2010 to December 2013

- Performed selective separation of biomass components in ionic liquid co-solvents.
- Performed multicomponent separation of bio-oil, phorbol esters and carbohydrates from whole biomass in fewer unit operations than used in industry.
- Conducted bio-oil producing fermentations.
- Mentored one GES undergraduate student through senior thesis research project.

HAWAII STATE ENERGY OFFICE | Honolulu, HI

*Renewable Energy Intern* | August 2013 to December 2013

- Performed analysis of feasibility of biofuels as blending stock for jet fuel in Hawaii.
- Provided technical guidance on hydrogen and biofuels topics.

UNIVERSITY OF HAWAI'I AT MĀNOA | Honolulu, HI

*Graduate Assistant* | August 2004 to August 2010

- Synthesized and characterized novel alkali, alkaline earth and transition metal borohydrides.

- Performed collaborative research with groups in Europe and at U.S. national laboratories.
- Taught and supervised weekly undergraduate laboratory classes.

### **SELECTED PEER REVIEWED JOURNAL PUBLICATIONS**

1. Sugai, C.; Kim, S.; **Severa, G.**; White, J.; Leick, N.; Martinez, M. B.; Gennett, T. Stavila, V and Jensen, C. M. (2019) Kinetic enhancement of direct hydrogenation of magnesium boride to magnesium borohydride upon mechanical milling with THF, MgH<sub>2</sub>, and/or Mg, *ChemPhysChem*, 20, 1-5
2. **Severa, G.**; Head, J.; Bethune, K.; Higgins, S.; Fujise, A. (2018). Comparative studies of low concentration SO<sub>2</sub> and NO<sub>2</sub> sorption by activated carbon supported [C2mim][Ac] and KOH sorbents. *Journal of Environmental Chemical Engineering*, 6 (1), 718-727.
3. Ordonez, R.C.; Hayashi, C.K.; Torres, C. M.; Melcher, J. L.; Kamin, N.; **Severa G.**; Garmire, D. (2017). Rapid Fabrication of Graphene Field-Effect Transistors with Liquid-metal Interconnects and Electrolytic Gate Dielectric Made of Honey, *Nature: Scientific Reports*, 7, 10171.
4. **Severa, G.**; Bethune, K.; Rocheleau, R.; Higgins, S. (2015). SO<sub>2</sub> sorption by activated carbon supported ionic liquids under simulated atmospheric conditions., *Chemical Engineering Journal*, 265, 249-258.
5. **Severa, G.**; Kumar, G.; Cooney, M.J. (2014). Co-recovery of lipids and fermentable sugars from *Rhodospiridium toruloides* using ionic liquid co-solvents: Application of recycle in batch fermentation, *Biotechnology Progress*, 30, 1239-1242.
6. **Severa, G.**; Kumar, G.; Troung, M.; Young, G.; Cooney, M. J. (2013). Simultaneous extraction and separation of phorbol esters and bio-oil from jatropha biomass using ionic liquid-methanol co-solvents. *Separation and Purification Technology*, 116, 265-270.
7. **Severa, G.**; Hagemann, H.; Longhini, M.; Kaminski, J. W.; Wesolowski, T. A. (2010). Thermal desorption, vibrational spectroscopy and DFT computational studies of the complex manganese borohydrides, Mn(BH<sub>4</sub>)<sub>2</sub> and [Mn(BH<sub>4</sub>)<sub>4</sub>]<sup>2-</sup>. *J. Phys. Chem C.*, 114, 15516-5521.
8. **Severa, G.**; Ronnebro, E.; Jensen, C. M. (2010). Direct hydrogenation of magnesium boride to magnesium borohydride: Demonstration of > 11 weight % reversible hydrogen storage. *Chem. Commun.*, 46, 421-423.
9. Cerny, R.; **Severa, G.**; Ravnsbæk, D. B.; Filinchuk, Y.; D'Anna, V.; Hagemann, H.; Haase, D.; Jensen, C. M.; Jensen, T. R. (2010). NaSc(BH<sub>4</sub>)<sub>4</sub>: A novel scandium-based borohydride. *J. Phys. Chem. C.*, 114, 1357-1364.
10. Hagemann, H.; Longhini, M.; Kaminski, J. W.; Wesolowski, T. A.; Cerny, R.; Penin, N.; Sørby, M. H.; Hauback, B. C.; **Severa, G.**; Jensen, C. M. (2008). LiSc(BH<sub>4</sub>)<sub>4</sub>: A novel salt of Li<sup>+</sup> and discrete Sc(BH<sub>4</sub>)<sub>4</sub> complex anions. *J. Phys. Chem. A.*, 112, 7551-7555.

### **PATENTS AND PENDING PATENT APPLICATIONS**

1. **Severa, G.**; Jensen, C. M.; Sugai, C.; Kim, S. (2018) Activated Magnesium Boride Materials for Hydrogen Storage. *PCT International patent (PCT/US2018/052306)*, pending.
2. Ronnebro, E., **Severa, G.**, Jensen, C. (2012). Direct synthesis of magnesium borohydride, U.S. Patent 8,147,788.