Alex Govaerts

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A materials engineer with R&D experience in materials development for photovoltaics, looking to expand characterization and process engineering experience. Worked with a close-knit, multidisciplinary team in a growing start-up company to develop and commercialize new technology, creating patents enabling lightweight, low cost solar modules. In 5+ years as a professional, had roles establishing process controls to execute comprehensive design of experiments (DOEs) with meaningful statistical analysis in complex materials systems. Furthermore, invented new patented technology and lead research to develop new scalable process flows to bring the technology to market.

Core Technical Skills

- Conducting R&D projects on new thin film materials and optoelectronic device structures
- Performing characterization of thin films and materials
- Optimizing processes through comprehensive design of experiments
- Troubleshooting process difficulties through data driven analysis
- Operating wet-processing and vacuum deposition tools in chemical labs

Relevant Professional Experience

Energy Everywhere Inc. (f.k.a. OneSun Inc.), Berkeley, California   **(**2014 – 2020**)**

Process Development Engineer
- Started with role developing active PV layer deposition processes of hybrid organic-inorganic lead halide perovskite solar cells (PSC) for 4 years within the R&D team
- Managed baseline performance of 5 processes, requiring root-cause analysis of complex process interactions when issues caused processes to fall out of spec
- Constructed DOEs for statistical hypothesis testing to improve process performance and efficiency
- Managed technology-transfer projects from academic development partners at Politecnico di Milano and Stanford University
- Installed and set up new lab equipment including glove boxes, coating equipment and ventilation systems
- Performed hazard analysis and developed safe handling and operating procedures when bringing new processes online or bringing new chemicals into the laboratory
- Created custom data processing scripts using Python to automate data output from managed processes

Research Lead
- Progressed to leadership role conducting research into scalable process flows to bring patented technology to market
- Managed laboratory technician, in-house laboratory operations and inventory, and characterization and metrology activities with external laboratories
- Mentored technicians and junior engineers in troubleshooting processing issues, as well as core materials science and PV concepts
- Constructed DOEs for statistical hypothesis testing to determine efficacy of new processes
- Designed test structures, performed and analyzed JV test data on new PV cells
- Presented experimental data to and planned future work with a multidisciplinary team of device physicists, chemists, product engineers, equipment engineers, and the VP of R&D
- Invented a patent for a new, low-cost solar cell structure

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- Filed PCT publications for additional innovations in solar cell structures
- Led equipment procurement projects for new in-house processing and characterization equipment
- Performed advanced materials characterization at the Stanford Nano Shared Facilities (SNSF)
- Contributed technical writing materials for Department of Energy grant applications, as well as contributing to overall application strategy
- Attended materials science conferences (MRS) to monitor the state-of-the-art of PSC tech

Patent Applications and Publications

- WO2019074616 "Fabrication of Stacked Perovskite Structures"
- PCT/US2018/062088 "Method and System for Perovskite Solar Cell with Scaffold Structure"

Additional Technical Skills

- **Process:** Ultrasonic Spray Coating, Doctor-Blade Coating, Spin Coating, Slot-Die Coating, Design of Experiments (DOE), Statistical Process Control (SPC), Glove-Box, Sputtering, Thermal Evaporation, UV-Ozone Cleaning, Plasma Cleaning, Acid-Etching, Die-Pressing
- **Characterization:** Scanning Electron Microscopy (SEM), Energy Dispersive X-Ray Spectroscopy (EDS), X-Ray Photoelectron Spectroscopy (XPS), Photoelectron Spectroscopy in Air (PESA), Atomic Force Microscopy (AFM), X-Ray Diffraction (XRD), Raman Spectroscopy, Fourier-Transform Infrared Spectroscopy (FTIR), UV-Vis Absorbance and Reflectance, Time Resolved Photoluminescence (TR-PL), Photoluminescence and Electroluminescence (PL & EL) Imaging, Current-Voltage (J-V) Testing, External Quantum Efficiency (EQE), Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Optical Profilometry, Optical Microscopy
- **Programming & Applications:** Python, R, VBA, G-code, JMP, ImageJ, Microsoft Office
- **Simulation and Design***:* SCAPS-1D, CAD (OnShape, Fusion 360)
- Exemplary technical writing and communication skills

Education

Master of Engineering (MSE), University of Toronto   (2012 – 2013)
- Optimized a copper indium selenide (CISe) nanowire chemical vapour deposition (CVD) process to increase light absorption in thin film photovoltaics
- Developed compatible ZnO chemical bath deposition process to create PV heterojunctions for future device fabrication and testing
- Performed electron microscopy and electron spectroscopy to characterize materials and structures

Bachelor of Applied Science (MSE), University of Toronto   (2007 – 2012)
- Fabricated and performed mechanical testing on thermal sprayed films for use in novel heat exchange structures
- Created failure mode maps correlating film thickness and strength to optimize processing specifications