MUHAMMAD HADI BIN MOHD HASAN

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SUMMARY

Engineer with experience in process improvement, manufacturing support, and materials development across battery, chemical, and coating applications. Proven track record in yield improvement, defect reduction, process optimization, and scale-up, supported by hands-on use of DOE, SPC, PFMEA, RCA, and Lean tools. Experienced in translating laboratory and production issues into practical technical improvements that strengthen quality, efficiency, and process stability.

EXPERIENCE

Process Optimization & Yield Improvement

Improved activated-carbon processing efficiency by increasing ball-milling effectiveness and reducing repeated washing cycle time by more than 80%, while supporting process control initiatives that sustained throughput yield above 90%.

Quality Engineering & Structured Problem Solving

Applied PFMEA, RCA, DOE, SPC, MSA/GR&R, CAPA, and 8D methods to improve process capability, reduce risk, and strengthen manufacturing control, including improving Cpk to above 1 and reducing RPN to below 120 for critical parameters.

Manufacturing Support, Scale-Up & Process Development

Supported process development across battery materials, activated carbon, coatings, and ceramic-based applications. Scaled up NVP cathode material while maintaining 1C electrochemical performance and optimized heat-treatment conditions through XRD-based analysis.

Coating, Slurry & Defect Elimination

Hands-on experience in slurry formulation, coating process control, and defect troubleshooting across battery and industrial applications, including resolving agglomerates, cracking, and peel-off in electrode coating, eliminating activated-carbon coating defects, and rectifying streaks, pinholes, and bubbles in roll-to-roll ceramic tape casting.

Continuous Improvement, Cost Reduction & Technical Execution

Delivered measurable gains through data-driven improvement projects, including around USD 50,000 in annual cost savings, approximately SGD 15,000 in capital expenditure avoidance, reduced material waste to under 10%, and improved documentation, SOP/WI revision, NCR/CAPA support, MES UAT, production scheduling, procurement, and NPI support across cross-functional teams.

EXPERIENCE

Research Associate at National University of Singapore from December 2023 to June 2026 (End of Contract)

- Produced NZSP ceramic material via solid-state synthesis route for electrolyte/catholyte/anolyte applications.
- Investigated ceramic/polymer electrolyte performance for bipolar solid-state sodium-ion batteries prototype.
- Fabricated coin full cell of solid-state battery using catholyte and anolyte made up of NVP cathode material.
- Executed end-to-end coin cell fabrication from slurry mixing to cell assembly prior to electrochemical testing.
- Produced cathode (NVP/LMFP/O3/NMC) and anode (TiO2) materials via wet-chemical synthesis route.
- Led scale up of NVP cathode material to pilot scale while maintained its performance of discharge capacity at 1C.
- Optimized heat-treatment (calcination) process to obtain desirable crystal structure of materials via XRD analysis.
- Troubleshoot electrode coating defects (agglomerates/cracking/peel-off) via slurry composition optimization.
- Supported technical reporting, chemical orders, lab consumables, equipment purchases, and daily lab operations.

Process Development Engineer at Regentech Pte. Ltd. from March 2023 to December 2023

- Improved the ball milling process efficiency of activated carbon (AC), saving SGD 15,000 in capital expenditure.
- Optimized the repeated washing process of AC to reduce its cycle time by more than 80%.
- Led the data analysis of the carbonization and activation processes to optimize the AC yield and quality.
- Oversaw application of AC into battery electrode coating to eliminate defects and improve the electrode quality.
- Took charge of the procurement, layout, and SOP for coin cell assembly and testing laboratory setup.

Senior Process Engineer at Dyson Manufacturing Sdn. Bhd. from March 2021 to February 2023

- Subject matter expert for front-end process consist of resistive ceramic ink and tape for ceramic heater application.
- Managed Process FMEA and led root cause analysis (RCA) activities to reduce the RPN to below 120.
- Improved process capability (Cpk) to above 1 for various critical to quality (CTQ) parameters via DOE activities.
- Led Lean Six Sigma projects utilizing DMAIC structure to achieve around $USD 50,000 in annual cost savings.
- Revised work instructions (WI) and supervised 5 technicians to sustain high throughput yield of above 90%.
- Rectified 3 surface defects (streaks/pinholes/bubbles) in roll-to-roll ceramic tape casting for enhanced quality.
- Assessed SPC charts using Minitab to govern process control and specification to sustain high-yield performance.
- Supported MSA / GR&R to enhance measurement precision and HAZOP study to enhance process safety.
- Contributed to cross-functional revisions of CP and SOP to strengthen process control and documentation accuracy.
- Prepared NCR reports, supported CAPA and 8D investigations with technical inputs and maintain documentation.
- Conducted UAT for MES, optimized weekly production scheduling, and supported NPI with tailored formulations.
- Contributed in outlining process requirements and joined FAT/SAT process for new equipment commissioning.

R&D Chemist at Totalgard Manufacturing Sdn. Bhd. from August 2019 to March 2021

- Resolved liquid chemical mixing inconsistencies to reduce waste of PET film and adhesives to under 10%.
- Commissioned and scale up adhesive coating process to achieve above 90% process accuracy.
- Communicated daily production performance and any safety incidents to 2 senior management personnel.
- Developed pigment formulations to reduce material cost up to 20% for nano ceramic film production.
- Led an industry certification process (MS 2669:2017) to ensure full compliance with quality standards.
- Developed SOP for slot-die and micro-gravure coating equipment to reduce downtime by around 10%.

R&D Engineer at Kossan Industries Sdn. Bhd. from April 2019 to July 2019

- Presented end products to US, China, and Germany clients, showcasing quality and generating $2M/project sales.
- Optimized SOPs and manpower via cycle time analysis, cutting labour costs by at least 50%.
- Managed process data for injection and compression moulding, enabling production of 10,000+ units monthly.
- Resolved formulation and mixing issues, reducing daily rejection rates from over 30% to below 1%.
- Investigated mould fouling on machines, reducing cleaning frequency and lower maintenance costs by up to 20%.
- Optimized box arrangement and packaging, improving palletization and reducing shipping costs by up to 50%.

Postgraduate Researcher at Universiti Kuala Lumpur from July 2015 to April 2019

- Investigated the effect of pyrolysis temperature and residence time on PKS biochar yield and properties.
- Characterized biochar to relate its composition with reinforcement potential in rubber product application.
- Formulated biochar dispersions and prepared natural rubber vulcanizate via wet compounding method.

Associate Engineer at Polyplastics Asia Pacific Sdn. Bhd. from May 2013 to July 2013

- Simplified P&ID and prepared training materials, improving competency across 20 staff.
- Worked with DCS operators to prevent plant trips and reduce production losses to below 1%.
- Complied with safety and operating procedures, maintaining consistent product quality with benzene below 5 ppm.

Industrial Trainee at PETRONAS Carigali Sdn. Bhd. from January 2013 to April 2013

- Managed oil well data and reports on 5 deferment causes (process, operation, wells, external, rotating equipment).
- Managed time effectively to complete 3 different assignments in one week using video and photo editing software.
- Collaborated across departments to learn onshore and offshore facilities, gaining insight into one new topic daily.

EDUCATION

- Master of Science Advanced Chemical Engineering, University of Manchester (United Kingdom), 2014
- Bachelor of Chemical Engineering Tech. (Hons.) in Process, Universiti Kuala Lumpur (Malaysia), 2013

TRAINING & CERTIFICATE

Lean & Process Improvement

- Lean Six Sigma Yellow Belt – Certified (Dyson Manufacturing Sdn. Bhd.)
- Lean Six Sigma Green Belt – Training (Non-certified)
- Gemba Kaizen / Value Stream Mapping / 5S / Stay Lean with Kanban
- Design of Experiment (DOE)

Analytical & Characterization Instruments

- 3Flex Physisorption (BET Surface Area) – Micromeritics
- Alpha-A High Performance Frequency Analyzer – Novocontrol
- Battery Tester – Neware & Arbin
- D8 Advance X-ray Diffractometer (XRD) – Bruker
- Differential Scanning Calorimeter (DSC) – TA Instruments (DSC 250) & Mettler-Toledo (DSC822e)
- Fourier Transform Infrared (FTIR) Spectrometer – Nicolet (iS10) & Agilent (Cary 630)
- MCR302 Rheometer – Anton Paar
- Particle Size Analyzer – Malvern (Mastersizer 2000 & 3000)
- SU3500 Scanning Electron Microscope (SEM) – Hitachi
- Thermogravimetric Analyzer (TGA) – TA Instruments (TGA 550) & Mettler-Toledo (TGA/DSC 1)
- Potentiostat – BioLogic (VMP3) & Metrohm Autolab
- Zetasizer Nano ZS90 (Particle Size & Zeta Potential Analyzer) – Malvern

Academic & Technical Workshops

- Short Course on Latex Science and Technology – PRIM
- Workshop & Symposium on Polymer Science & Technology – Society of Polymer Japan
- Polymer Research Seminar – Kyoto University