Zama Duma

Masters in Science (Chemistry)

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Summary

Experienced, discerning, adaptable, and results-driven chemistry-, biochemistry- and cell biology degree holder. I have exceptional leadership skills and great accumen in good laboratory practices, catalyst design, calibration, and maintenance of laboratory analytical instruments. I am fluent in Zulu and English with an interest in learning more languages.

Personal Details

Date of Birth:	06 May 1994
Sex:	Male
Age:	29
Marital Status:	Single
Nationality:	South African
Driver's License:	Code 10

Skills

Good Laboratory Safety, Health, and Environment conduct

Adherence to safety and personal protective equipment
Safety data sheet compliance
Compliance with waste classification standards

Analytical chemistry

Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). Inorganic and organic Sample preparation, digestion, and analyses. Calibration of ICP-OES including standards preparation.

Gas Chromatography – Method development and optimisation; gas and direct liquid injection, calibration, and instrument troubleshooting. Certificate of competence from the National Metrology Institute of South Africa and Scion analytical instruments.

Physisorption and chemisorption analysis. Nitrogen adsorption-desorption isotherms, temperature-programmed surface reaction such as Temperature-Programmed Reduction (TPR).

Heterogeneous catalyst design

Optimization of Gas-to-liquids cobalt on alumina and silica supports used to convert synthesis gas (Carbon monoxide and hydrogen) into short- to long-chain hydrocarbons

Synthesis and characterisation of palladium nanoparticles on aluminosilicates for the dehydrogenation of chlorine gas for the assessment of the efficiency of diaphragm cells used for brine electrolysis

Synthesis and characterisation of copper-based catalysts for thermocatalytic hydrogenation of carbon dioxide to methanol

People Skills
Integrates well into new teams, assertive, confident, shares knowledge and resources with colleagues

Leadership Skills
I have been on the committee of a Junior Engineers Forum in Sasol as a vice-chairperson and development portfolio-holder
National student representative in the executive of the Catalysis society of South Africa (CATSA) in the year 2022.
CATSA Executive Committee (2023-2025)

Computer skills
Microsoft Excel, Origins, PowerPoint, Word, Outlook, Adobe reader and Laboratory Information Management System (LIMS)

Collaborative skills
I have formed part of dynamic teams which worked towards resolving problems through collective and collaborative efforts

Confidence and assertiveness skills
I have a certificate of completion for a course on how to confidently assert yourself in the workplace whilst simultaneously adding value to the organisation and developing my career.

Education

J.E Malepe Secondary School *2008-2012*
Matriculated Third in Class

University of the Witwatersrand
BSc in Chemistry, Biochemistry and Cell biology *2013-2015*

BSc (Honours) in Chemistry *2016*

Sasol
Sasol Scientist Internship Program graduate *2019*

Master's in science in preparation of dandelion-like rutile titania nanoparticles for photocatalytic applications *Jan–Aug 2020*

Masters in catalysis in preparation of copper-based catalysts supported on metal-organic frameworks for thermocatalytic hydrogenation of carbon dioxide to methanol *2020-2022*

Council for Scientific and Industrial Research (CSIR) 2020-2022

Visiting student, Master's carbon dioxide valorisation to value-added products

Experience

Sasol *2017 – 2019*
Scientist in Training

Research and Technology: 2017

Research on catalyst testing and optimization (Heterogeneous Catalysis)
Circumvention of catalyst deactivation
X-ray diffractograms (XRD), scanning and transmission electron micrographs (SEM and TEM) interpretation
Brunauer–Emmett–Teller surface area and pore volume analyses of catalyst
Particle size distribution determination of catalyst supports with a pre-determined morphology

Sasolburg Operations *2018*

Technical support: Process support and trouble-shooting in ChlorAlkali Plants
Quality assurance: Commissioning of laboratory analytical instruments
Quality assurance: Compilation of standard operating procedures for analysis of various chemical species
Quality assurance: Liaison with main laboratory analysts and chemists to assist satellite laboratories for the preparation of standards and verification of data
Water analysis and treatment in effluent plants
Custodianship of Water Use License issued by the Department of Water and Sanitation

Wax Research and Development Laboratory *2019*

Distillation and saponification of wax into various products with different applications
Oxidation of hard wax
Collaboration with customers to bring novel wax products, with improved performance into the market
Analyses of wax properties such as: Congealing point, drop melting point, ASTM colour and acid number

Research and Technology *2020*

Direct mercury analysis – Calibration and certified reference material analyses
Inductively coupled plasma – Optical Emission Spectroscopy
Standards preparation and on-the-job training
Ultra-clean glassware practice
Ashing of organic samples using sulfuric acid
Acid digestion of inorganic samples using aqua regia

Preparation of organic and aqueous solutions
Calibration and data reprocessing of ICP instrument

University of the Witwatersrand

Tutor, Targeting Talent Programme *June 2015*
Science and Mathematics programme for underprivileged grade 11 and 12 sponsored by British Petroleum
Tutoring on electrochemistry and demonstration of laboratory experiments

Laboratory Demonstrator *2016*
Laboratory supervision for first year chemistry students
Marking and correction of laboratory scripts
Assist with experiments

University of Brigham Young, Department of Chemical Engineering
Scholar, Utah, U.S.A *July 2017*
Catalyst deactivation and Regeneration: Fundamentals and Practice
Theory and Practise of the mechanistic deactivation of heterogeneous Fischer-Tropsch catalysts

University of Strasbourg, Institute of Chemistry and processes for Energy, the Environment and Health (ICPEES) *June 2022*
Internship, Strasbourg, France
CatalystS' analysis using carbon dioxide-temperature-programmed desorption, hydrogen temperature programmed reduction, and reactive frontal chromatography using nitrous oxide.

Paul Sabatier University/IMT Mines Albi *June 2022*
Scholar, Albi, France
2nd Summer School in catalysis: from understating to applications

Achievements

Matriculated third in class **(2012)**;
Top 15% in first year of university **(2013)**;
Golden key international honour award **(2013);**
Vice-Chairperson of Engineering Forum **(2017)**;
TechnoX exhibition stand with best content **(2018)**;
Graduate of Sasol Scientist Internship Program for Scientist **(2019)**;
Certificate of achievement for the successful preparation, characterisation and testing of a palladium-supported on aluminosilicate fibres for hydrogen-in-chlorine gas quantitation **(2020)**
Record of Achievement – Emerging respiratory diseases, including COVID-19: Methods of detection, prevention, response and control **(2020)**;
Second Runner Up: Student oral Presentation at the 31st Catalysis Society of South Africa Conference – Virtual 7-10 November 2021 **(2021)**

Catalysis Society of South Africa (CATSA) national student representative **(2022)**
Best Student – Council for Scientific and Industrial research **(2022)**
Catalysis Society of South Africa (CATSA) Executive Committee (**2023-2025**).

Interests

Catalyst design, exercising; Non-fiction books; Church; Raising HIV and AIDS awareness; Photocatalysis; Emerging respiratory diseases; Word searches

References

Professor Suprakash Sinha Ray, Centre Manager (CSIR)
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Dr. Thys Botha, Senior Manager (Sasol)
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Dr. John Moma, Senior Lecturer, Heterogeneous Catalysis (Wits University)
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