



# Get to know the corrosion fighters

They have told us their story, how will yours be?



**JUSTICE NWADE**

Winner of the student grant to access the  
**Nuclear Corrosion Summer School**

## Could you give us a little presentation of yourself?

My name is Justice Nwade, a 31-year-old Nigerian. I am a PhD candidate at the Institute for Nuclear Waste Disposal, of the Karlsruhe Institute of Technology (KIT) in Germany. I'm an alumnus of the EMINE program - European Master's in Nuclear Energy, in which I obtained a double masters in Nuclear Engineering and Materials Science from UPC Barcelona and Grenoble INP respectively. After completing my bachelors in Chemical Engineering, I worked as an operations engineer for about 5 years with Sahara Power Group, a utility company in my home country, before proceeding for my masters abroad.



## What do your studies consist of?

My PhD study is in the framework of the BMBF funded NaMaSK project. We are working to optimise the MASK plant developed for the magnetic separation of steel particles from the steel-abrasive mixture produced during water-abrasive suspension (WAS) jet segmentation of Reactor Pressure Vessels. In this project, protecting the steel particles from corrosion is a priority.

## What is its relation with nuclear corrosion?

Reactor Pressure Vessels are at the heart of nuclear power plants, and their decommissioning is a tough job. For my PhD project, we need to control the corrosion of the steel grains produced during the WAS cutting of RPV steels, to ensure their separation in the MASK plant we developed. The RPV materials have been activated from neutron interaction over the years of operation. So, we are studying RPV steel corrosion mechanism, effective corrosion inhibitors for it and the effect of ionising radiation on the inhibition mechanism.

## What do you like the most about nuclear corrosion?

Nuclear corrosion is an exciting field to work and do research on because it addresses real challenges faced in nuclear facilities. The complex nature of the degradation mechanisms and corrosion initiators, especially ionising radiation, make the search for solutions fun.

**How did you get here? How did you discover this world?**

My earliest exposure to the world of corrosion research was during my graduate engineer role in the chemistry department of Egbin Power Plant in Nigeria. I had hands-on experience with their feedwater chemistry programme; water treatment and dosing oxygen scavengers to mitigate corrosion in the boiler circuit. During my EMINE masters, we had extensive lectures on nuclear corrosion from experts like Dr. Damien Feron of CEA. It was interesting to learn about the life-limiting challenge of stress corrosion cracking and other degradation mechanisms in nuclear facilities, the advances in materials design and corrosion mitigation. We also did experiments on the oxidation of fuel cladding material during a LOCA - It was super interesting. So, when my PhD project came up, I did not hesitate to dive in.

**If you didn't dedicate yourself to study this field, what would you have liked to do?**

Probably keep running and managing a gas turbine plant.

**Where do you see yourself in the future?**

I am an ambitious person who loves problem-solving and working with others. I think this set of attributes gets people to the top of their chosen career, and that is where I would like to be in the future.

**Do you think networking will be important to get there?**

Obviously.

**Do you think the nuclear corrosion field needs more visibility?**

Last year, it was all over the news that French reactors were going offline because of corrosion. So, nuclear corrosion is already visible for the wrong reason. What should be more visible however is the cutting-edge research in materials and mitigation strategies developed by industry and research institutions in addressing nuclear corrosion challenges.

**In your opinion, what is the single most valuable attribute a researcher should have?**

Among the list of attributes a successful researcher should have, curiosity tops it for me. Constantly asking questions and probing for answers is how new knowledge is created.

**What advice would you give to students in an early stage of their careers?**

Well, I'm also in the early stage of my career as a researcher. I would advise myself and others like me to be persistent, to soak up as much knowledge as is available and not be afraid failing.

**Could you say what it is and how you see the future of engineers/corrosion scientists?**

Corrosion is nature returning processed metals and alloys back to their original oxidized states. The reliability of all that make up our current technological age hinges on how well we can master and control this process. Engineers/scientists in this field are the superheroes of our technological universe. The future is ours.

**Corrosionist... is it born or made?**

Made.

**TO END... COULD YOU TELL US...**

- **A color:** Blue
- **A number:** 2-5-7 (that looks like my birthday)
- **A song:** Still Moving by William McDowell
- **A hobby:** Playing table tennis with my wife.
- **A city:** Barcelona