

Walter W Focke: Personal details

I am the Director of the Institute of Applied Materials (IAM) at the University of Pretoria. The activities of the Institute are presented on the web site: <http://www.up.ac.za/institute-of-applied-materials-iam>. Six Professors, one administrative officer and four technicians from the Department of Physics and the Department of Chemical Engineering are actively involved. IAM performs applied research for industry pursued in R&D targets in Fluoro- and Carbon materials, as well as chemical and polymer technology. We supervise more than 50 postgraduate students and the annual research budget exceeds R 10 million. We typically publish in excess of 35 peer-reviewed papers every year.

My personal research is primarily funded by industry and therefore has an applied flavour. My focus is on chemical and polymer technology in the fields of carbon technology, clay & polymer additive technology and pyrotechnics.

My own carbon-related research considers graphite as a functional additive for polymers to improve fire resistance and conductivity. My students have synthesised and characterised carbon precursor materials and modified graphite materials, investigated the high-temperature oxidation of graphite and tried to improve the fire resistance, mechanical and antistatic properties of polymers with clays and graphite. During the review period I have published 28 peer reviewed publications in Carbon Technology.

In chemical and polymer additive technology we rely heavily on thermal analysis techniques and we apply them to study (a) the oxidation behaviour of materials targeting either the inhibition or enhancement of the rates of degradation or combustion; and (b) the release rates of migrating or volatile actives such as volatile corrosion inhibitors and insect repellents. The synthesis, purification and processing of clays, carbons, graphite is targeted towards additive applications in polymers. They are used to prepare and characterise polymers and polymer macro- & nanocomposites with improved properties. Of particular interest are improvements in thermo-oxidative stability, flame retardancy and controlled release of actives.

I collaborate strongly with the UP Institute for Sustainable Malaria Control (<http://www.up.ac.za/up-centre-for-sustainable-malaria-control>). This Institute conducts multidisciplinary research and we contribute to research of chemical and physical vector control activities. In essence we apply our skills in chemical and polymer technology to design and develop products that may help to reduce the malaria burden.

During the review period I have published 65 peer reviewed papers in this field of clay and polymer additive technology.

In pyrotechnics I have a narrow focus on green pyrotechnics for time delays and initiating systems for chemical mine detonators. In the period of review, I published 14 papers in the pyrotechnic field.

On 20 January 2016 my overall citation statistics were as follows:
Scopus: Total of 136 publications; 2073 citations and an h-Index of 17
Google Scholar: 2336 citations; h-Index of 20 and i-10 index of 46

From 2009 to 2016 I have made a total of 92 conference contributions, internationally and locally.

In 2015 I was honoured as one of the Exceptional Academic Achievers of the University of Pretoria (http://www.up.ac.za/en/news/post_2071009-2015-academic-achievers-awards). I received the Department of Trade and Industry (dti) Technology Award in the category Competitiveness of Technology Partner for the Technology and Human Resources for Industry Programme (THRIP) in October 2009; a Chemical Technology Award for supervising the winner of the Special Environmental Award 2009. iSlices Manufacturing was awarded a Technology Top 100 award for sustainability for a gel product licenced from the CSIR and originally invented by Drs Patricia Truter and Walter Focke. Beyond this, the students I supervised won numerous awards and accolades that are, owing to space limitations, listed in the Section: Best Research Outputs from Student Supervision.

I joined the University in 1997 and to date I have supervised 33 Masters' and 22 PhD students to graduation. This means that I graduate about one PhD and 1,5 Masters' students per annum. I also teach Polymer Processing at Post graduate level and Thermodynamics at undergraduate level in the Department of Chemical Engineering.

I successfully organised the 11th International Conference on the Frontiers of Polymers and Materials (ICFPAM), Pretoria, 22-27 May 2011. More than 350 scientists and engineers attended. I was also the lead Editor for the proceedings.

Currently I am serving on the technical and the international steering committee for the International Pyrotechnics Society Seminar Series and plan to bring this conference to the RSA.

I have productive collaborations with the following persons and institutions:

- Prof R Androsch, University of Halle-Saale, Germany
- Prof U Wagenknecht and Dr A Leuteritz, Leibniz Institute for Polymer Research, Dresden, Germany
- Prof M Kaci, Université Abderrahmane Mira, Bejaia, Algeria
- Prof C Madivate and Dr H Muaimbo, University of Eduardo Mondlane, Maputo, Mozambique

I am on the Editorial Board of the Journal of Vinyl and Additive Technology, the Journal of Polymer Engineering and the International Journal of Adhesives and Adhesion. I was recently approached to join the Editorial Board of the journal Propellants, Explosives, Pyrotechnics