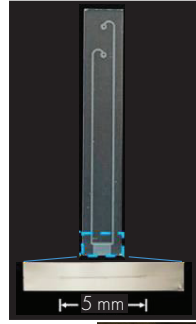
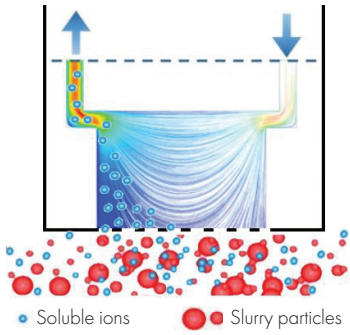
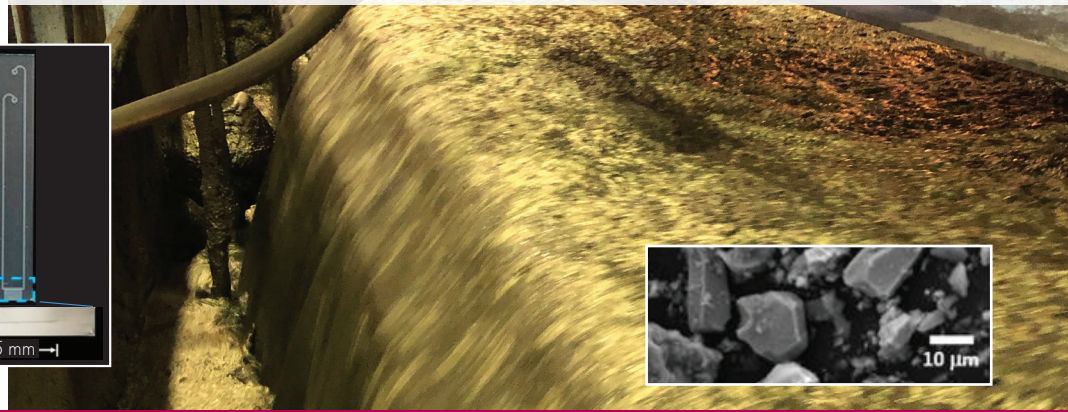




ANFF-SA



Increasing minerals plant processing efficiencies with a sip through a chip



Providing micro and nano fabrication facilities for Australia's students, academics and industry

A novel micro-sized device, able to 'sip' particle-free liquid samples from slurry, is set to optimise minerals processing with access to innovative and cost-effective on-site analysis.

Designed and fabricated in Adelaide, the glass microchip (also known as lab-on-chip) is an ingenious solution enabling enormous mineral processing plants to accurately monitor and immediately adjust their process chemistry, in-situ and in real time.

For an industry facing a multitude of challenges, the microfluidic chip presents world-first opportunities to optimise mineral processing plant efficiencies and reduce associated environmental impacts.

What began as an idea between Associate Professor Craig Priest, Research Fellow at the University of South Australia's Future Industries Institute and Dr Christopher Greet, Manager Minerals Processing Research at Magotteaux Australia, has resulted in a compelling research-industry success story.

The research team recently published their results in *Angew Chem Int Ed*, created a prototype, and are commercialising the technology.

The team brought together Professor Michael Breadmore (University of Tasmania), Dr Aliaa Shallan (University of South Australia) and Dr Moein Kashani (South Australian Node of the Australian National Fabrication Facility, ANFF-SA), with world-class skills in analytical chemistry, microfluidics, and

computational fluid dynamics simulations.

"ANFF-SA was the cornerstone for this research," said A/Prof Craig Priest.

"The chip development required excellence in both advanced manufacturing and simulations. Dr Kashani's ANFF-SA simulations provided insight into the unique flow behaviour that experiments alone could not deliver."

Collectively, the team have designed and fabricated a glass microfluidic device, capable of withstanding turbulent environments, which has an extended slit opening to shield the chip's internal laminar flow.

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Taking sample 'sips' of particle-free solution from high-solid content streams for testing, the chip's design effectively prevents blockages of the sensor chip, even after long periods of operation.

Dr Christopher Greet, of Magotteaux, said the microfluidic device could provide rapid, accurate and cost-effective on-site monitoring, eradicating crucial wait times for external laboratory testing.

"We have developed a core digital technology which will transform the minerals processing industry. By optimising reagents

we maximise our recoveries and grades, and through better reagent utilisation, we can contribute to better environmental outcomes."

The glass chip was fabricated in ANFF-SA's world-class cleanrooms, utilising the lithography capabilities of the Kloe Dilase 650 direct laser write system and the flagship Kira CNC Mill to machine the custom-made holder.

"This project is a great example of what industry-research collaborations can achieve. Industry knowledge is critical in informing adventurous research projects."

The device is an enabling technology which be widely applied for onsite instant analysis of chemical processing, biological suspensions, and environmental stream samples to eliminate sending samples to a laboratory.

Co-located at the University of South Australia and Flinders University, ANFF-SA specialises in microfluidics, biomaterials, organic electronics, novel semiconductor materials and characterisation.

Providing leading-edge research capabilities, equipment and expertise, ANFF-SA is an open access facility for researchers, academics and industry which supports excellence in world-class science research and collaboration.

For more information visit anff-sa.com or contact Simon Doe on 8302 5226.

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