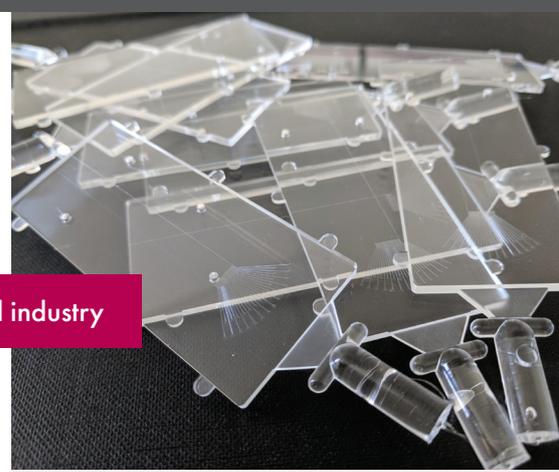


Chip-based high-value mineral extraction



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

Researchers at the University of South Australia's Future Industries Institute (FII) have developed a faster, cheaper, and safer way of refining high-value metals by exploiting microfluidic chip technology.

The approach has been demonstrated for platinum and rare earth elements over the last five years and now the group is scaling up to handle commercial volumes.

Recycling precious metals is often achieved by dissolving valuable waste or ore in highly acidic water, then using a specific chemical to selectively react and extract the valuable metal into an oil.

The oil containing the valuable metal is then separated from the water which carries away everything else, but this can be difficult because droplets are formed during mixing and coalescence, which can be slow or completely fail for complex extraction systems.

To speed things up, the team designed a new microfluidic chip which forces many streams of water and oil to flow

parallel to one another, achieving rapid extraction without a slow phase separation step.

The valuable metal effectively "changes lanes" from stream to stream like traffic on a microfluidic freeway, usually within just a few seconds of contact.

UniSA's new chips allow 20 times higher throughput than previous chip designs.

"The ANFF SA facilities helped the team

“
The ANFF-SA facilities helped the team transition from an 'idea' through to 'proof-of-concept.'
A/Prof Craig Priest ”

transition from an 'idea' through 'proof-of-concept' and now exploring higher TRL (technology readiness level) testing and manufacturing," A/Prof Craig Priest, Project leader, Senior Research Fellow at UniSA's Future Industries Institute, and ANFF SA Director.

Modelling of the microfluidic chip was conducted using ANFF's Design House suite of software. The chips were fabricated in ANFF SA and Optofab

Jobs for the future



Innovation



Helping business



Research & collaboration

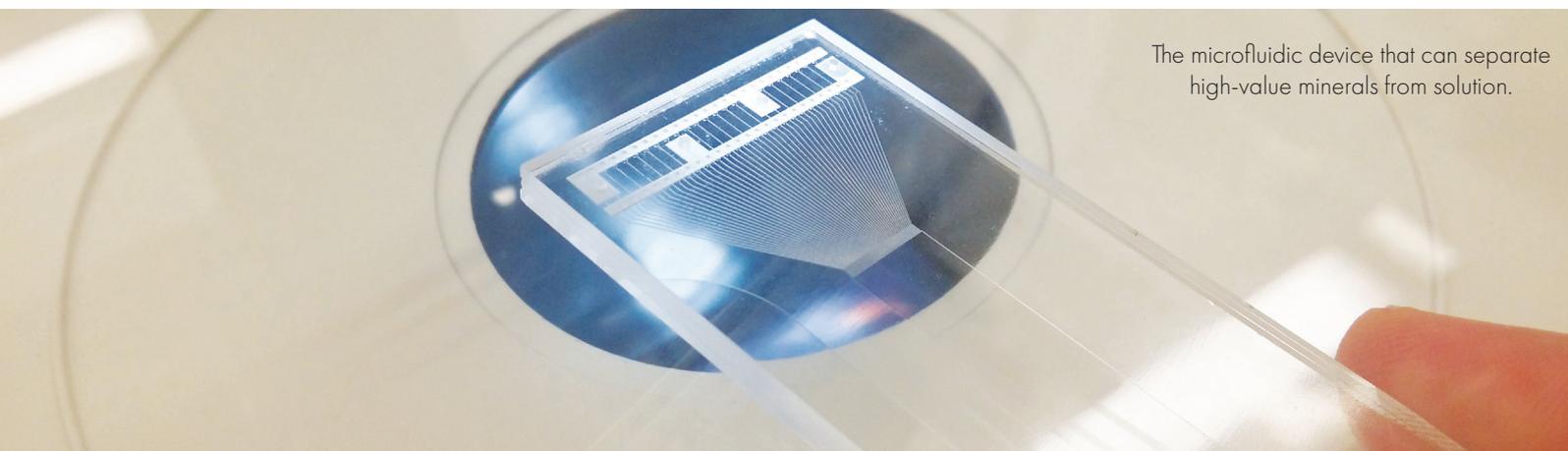


Incentives for investors



laboratories using photolithography, etching, laser milling and thermal bonding of glass.

"ANFF SA's micro-injection moulding and micromilling capabilities will be critical in the development of the next generation prototype and developing methods that are suitable for mass manufacturing," Craig added.



The microfluidic device that can separate high-value minerals from solution.

South Australian Node of the Australian National Fabrication Facility

Future Industries Institute, University of South Australia, Mawson Lakes, SA, 5095 +61 8 8302 5226 www.anff-sa.com.au