

ALTERNATIVE FUELS

Bioanode beginnings

By **REBECCA THYER**

RESEARCH to replace petroleum coke and coal tar pitch with carbon alternatives could play a role in improving supply and quality issues for Australia's aluminium industry, and benefit the environment by offsetting carbon.

One alternative being explored by CSIRO Minerals researchers Dr Malisja de Vries and Roy Lovel is the use of wood char.

"The aluminium industry relies on petroleum coke and coal tar pitch to produce high-quality, dense carbon anodes," Dr de Vries says. "However, declining coke quality, security of supply and environmental concerns threaten the quality of aluminium production and are driving the development of alternative carbon sources. The Light Metals Flagship has taken up this research challenge and is looking for alternatives."

Biomass is an attractive alternative because it is renewable and has low sulfur and ash content, she says. However, wood char, successfully trialled by CSIRO in steel plants for similar reasons, needs additional processing to produce anodes for aluminium production because of its low density.

"By blending charcoal with biopitch to make a coke-like material, we are working to overcome this issue," Dr de Vries says.

Characterising various charcoals and their properties is an important part of the project. "We are using this knowledge to develop bioanodes that perform the same function as traditional anodes. And early research suggests anode production from softwoods and hardwoods will require different process methods because of their unique cellular structures."

The research is generating interest and Dr de Vries plans to have several 'biocoke' samples ready for industry to trial early this year.

The beauty of the biocoke idea is that the process is greenhouse-neutral: carbon dioxide liberated in the aluminium production process is absorbed by the successive growing of trees.



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"For biocoke to address the broad range of objectives, ideally each operation would develop and maintain its own plantations. This will help to close the carbon loop, recycle carbon dioxide and lead to improved environmental outcomes."

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Samples

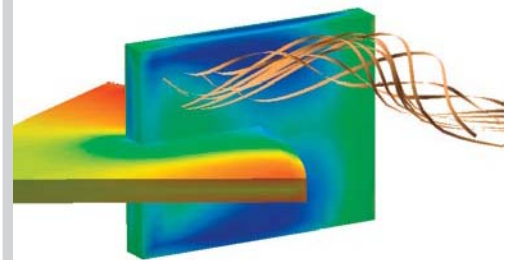
Sustainable CRC gets tick of approval

The Centre for Sustainable Resource Processing (CSRP) recently passed its third-year review by the Federal Department of Education, Science & Training with flying colours. As part of the review process, members of the independent international panel visited many of the CSRP's research partners, toured their sites and heard from their staff. The panel was supportive of the CSRP's direction and progress, and impressed by the facilities and science it draws on. The CSRP comprises 21 participants, including the major resource companies in Australia, and aims to create new methods to produce minerals and metals in a way that benefits the community, the environment and industry.

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Model of a conference

CSIRO recently hosted the 5th International Conference on Computational Fluid Dynamics (CFD) in the Process Industries. The conference had a strong emphasis on minerals processing and metal production, and Dr Andrew Shook, global technology manager for BHP Billiton, delivered the opening address. Keynote speakers included Professor Jan



Cilliers (Imperial College London) who described modelling of flotation froths, Professor Jinghai Li (Chinese Academy of Sciences) who explained the necessity for multi-scale modelling in gas-particle systems, and Professor Harrie van den Akker (Delft University of Technology) who argued that large eddy simulation should be used more often for complex multi-phase flows. The conference also included mini-symposia on gravity separation, light metals applications, gas-particle flows and bio-engineering. Full conference proceedings are available on CD-ROM. Phil.Schwarz@csiro.au