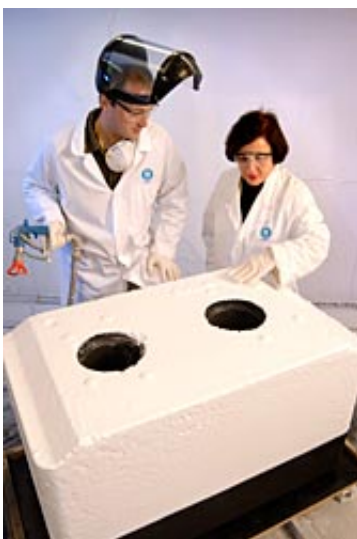


# New barrier coating offers savings for aluminium smelters

February 23 2009

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CSIRO project officer Enzo Gulizia and Dr Mahnaz Jahedi inspect the surface of a freshly coated carbon anode, intended for use in a trial at an aluminium smelter.

(PhysOrg.com) -- A barrier coating developed through CSIRO's Light Metals Flagship offers aluminium smelters significant annual savings in reduced consumption of petroleum coke alone.

Smelter trials indicate that the low-cost coating prevents air burn oxidation and extends the operational life of carbon anodes used in high-temperature electrolytic cells.

Use of the coating was shown to produce a net reduction in carbon usage of 0.02 Kg carbon/Kg aluminium produced.

“Our coating can provide considerable savings for the companies operating the more than one hundred smelters that produce aluminium at present,” said Dr Mahnaz Jahedi of CSIRO Materials Science and Engineering.

Dr Jahedi presented the results of the project at a recent meeting of The Minerals, Metals and Materials Society in San Francisco.

Carbon anodes are made from petroleum coke, and in the extreme heat of aluminium electrolysis cells, the exposed top and sides of the anodes can oxidise spontaneously due to air burn.

Air burn can spread rapidly between anodes, and necessitates more frequent interruptions to the smelting process to replace anodes.

The CSIRO coating performed significantly better than conventional aluminium spray coating.

“The trials demonstrated that the coated anodes don’t develop air burn, and last longer in the smelter cells as a result,” said Dr Jahedi.

The trials were designed to test the efficacy of the coating by placing coated anodes in positions in the electrolytic cells found to be particularly prone to air burn.

“None of the coated anodes had to be removed due to air burn during the trials,” Dr Jahedi said.

Uncoated anodes placed in similar positions needed to be replaced more frequently due to severe air burn.

The cost-effective coating also proved durable during trials, remaining undamaged during transport of anodes to the smelter and during in-plant handling.

“The coating did not melt or crack while the anodes were in use. The trials showed no safety issues with application or use of the coating in smelters.”

The coating is simple to apply, and adheres well to the carbon anode.

The next stage of in-plant trials will use several hundred coated anodes and is expected to provide a complete assessment of the productivity improvements offered by the coating.

CSIRO plans to license the coating technology to smelters, and invites expressions of interest in the technology.

Provided by CSIRO

Citation: New barrier coating offers savings for aluminium smelters (2009, February 23)  
retrieved 26 April 2024 from

<https://phys.org/news/2009-02-barrier-coating-aluminium-smelters.html>

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