

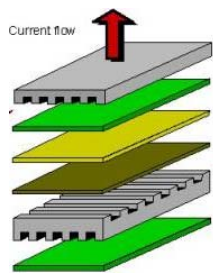
# Electrodeposited Mn-Co Alloy Coating for SOFC Interconnects



Source:  
<http://people.bath.ac.uk/cf233/sofc.html>

Solid Oxide FCs (SOFCs) use stainless steel interconnects

Require coating to eliminate chromia scale growth and chromia diffusion limiting SOFC performance



STATUS Q/UO

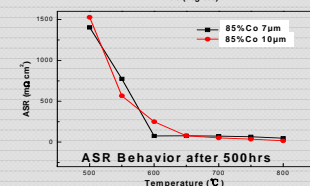
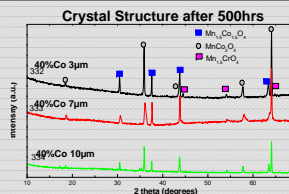
## OVERALL OBJECTIVE:

- Develop an inexpensive manufacturing process for SOFC interconnect coating.

## PRELIMINARY ECONOMICS:

- Scaleable to a high volume manufacturing process (> 1,600,000 plates/year).
- Coating cost of \$1.85/interconnect

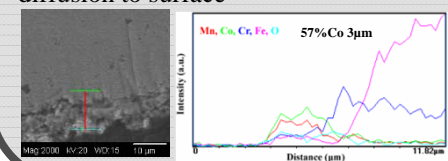
PHASE I RESULTS



ASR after 500hrs at 800°C

	40% Co	57% Co	85% Co
3µm	48.6	25.9	19.5
7µm	31.5	12.0	53.9
10µm	35.5	12.0	49.5

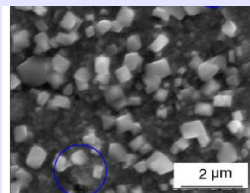
Sufficiently dense coating to prevent Cr diffusion to surface



PHASE I ACHIEVEMENT

- Deposited range of compositions
- Thickness range 6-15 microns
- Demonstrated coating stability
- Determined oxide growth rate for various thickness and alloy compositions after thermal exposure

NEW INSIGHTS

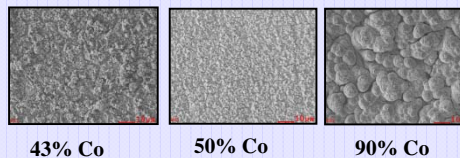


(Mn,Co)<sub>3</sub>O<sub>4</sub> spinels are a conductive interconnect coating with good Cr retention & CTE match with cathode materials & ferritic ss

FARADAYIC<sup>®</sup> ElectroDeposition (i.e. the application of pulse & pulse/reverse electric fields and simplified plating chemistries, for Mn-Co alloy coating to the SOFC interconnects.

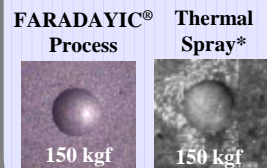
PHASE I RESULTS

## Range of alloy compositions

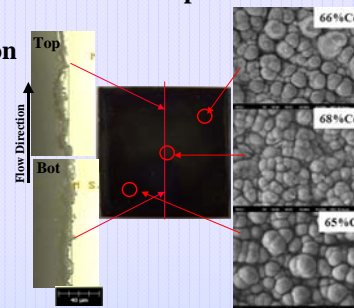


## Thickness and composition uniformity

### Greater surface adhesion



\*Sun, X., et. al. JPS, 176 (2008) 167



(Mn,Co)<sub>3</sub>O<sub>4</sub> spinels are being investigated for coating SOFC interconnects to prevent chromia scale growth and chromium evaporation that can cause unacceptable degradation of the SOFC electrochemical performance