

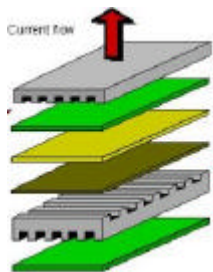
Electrodeposited Mn-Co Alloy Coating for SOFC Interconnects



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 QVO

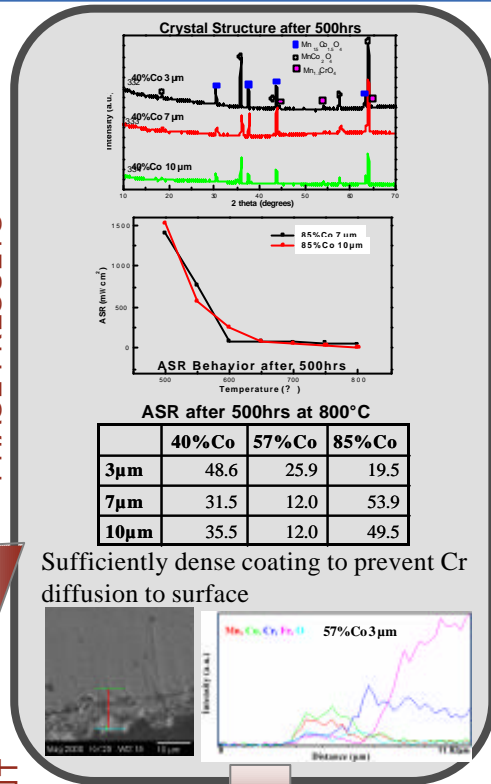
OVERALL OBJECTIVE:

➤ 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

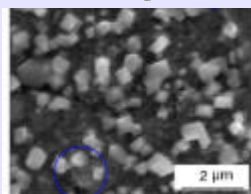
PHASE I RESULTS



Sufficiently dense coating to prevent Cr diffusion to surface

- Deposited range of compositions
- Thickness range 3-10 microns
- Demonstrated coating stability
- Determined oxide growth rate for various thickness and alloy compositions after thermal exposure

PHASE I ACHIEVEMNT



(Mn,Co)₃O₄ spinels are a conductive interconnect coating with good Cr retention & CTE match with cathode materials & ferritic ss

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

NEW INSIGHTS

Range of spinel compositions



Thickness and composition uniformity

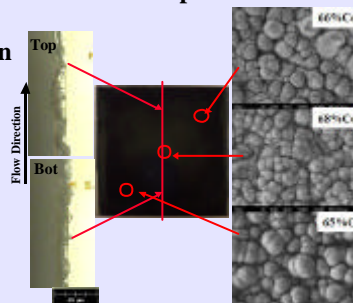
Greater surface adhesion

FARADAYIC Process



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

Thermal Spray*



(Mn,Co)₃O₄ 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