

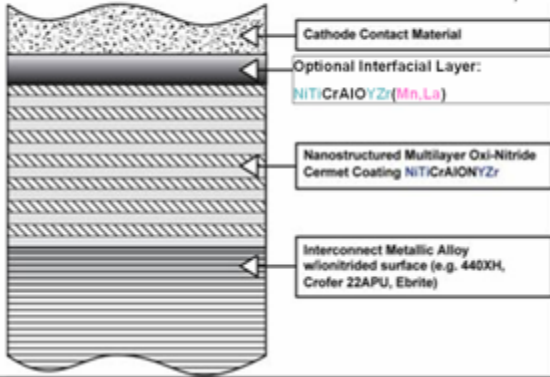
Oxidation Resistant, Cr retaining, Conductive Coatings on Metallic Alloys for SOFC Interconnects

(Project ID: DE-FC26-04NT42225)

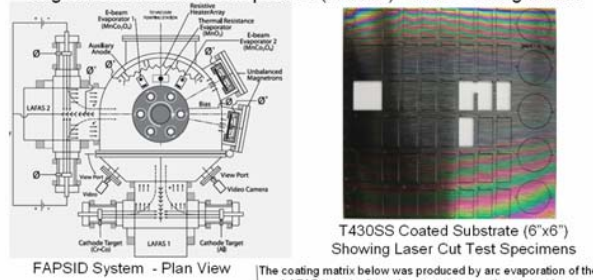
Principal Investigator: Dr. Vladimir Gorokhovskiy, Arcomac Surface Engineering, LLC – Bozeman, MT USA

Arcomac's Coating Design:

(Must Permit Use of Inexpensive SOFC Metallic Interconnects at ~750C for ~5 Year Device Life-time)

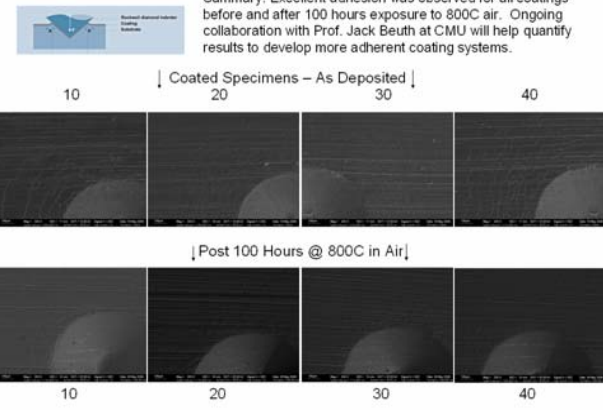


Patented Filtered Arc Plasma Source Ion Deposition (FAPSID) Surface Engineering System, Example T430SS Coated Substrate and Recent Large Area Filtered Arc Deposited (LAFAD) Oxide Coating Matrix



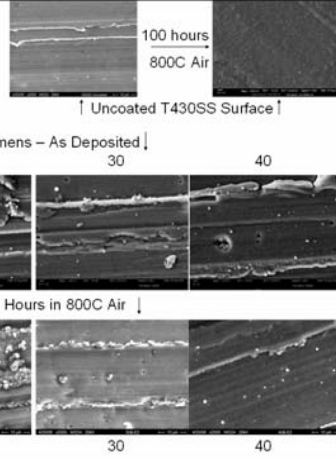
LAFAD Coating Process Information			Elemental Composition (at %)				
Designation	Left Target	Right Target	Al	Cr	Co	Ti	O
10	CoCrAlY	Al	16	6	23	N/A	bal.
20	CoCrAlY	CrAlY	18	14	12	N/A	bal.
30	CrAlY	Cr	14	24	N/A	N/A	bal.
40	CrAlY	TiCrAlY	23	14	N/A	2	bal.

Adhesion Results – Coated T430SS

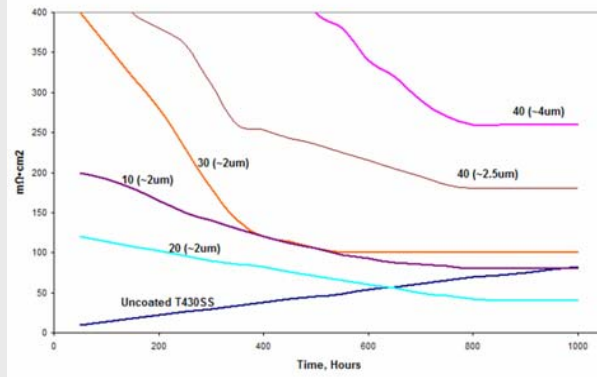


Surface Morphology

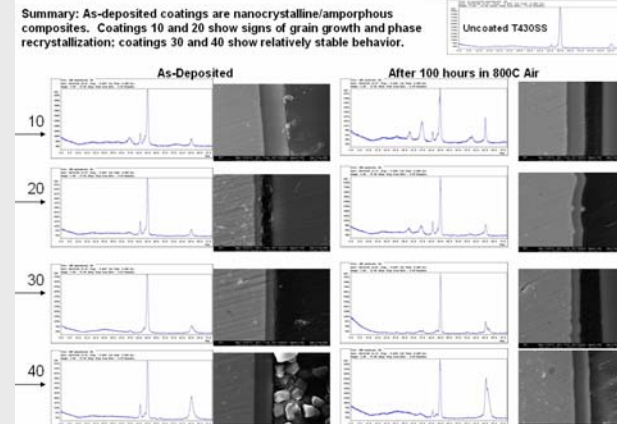
Summary: Recrystallization and new phase formation was observed in coatings 10 and 20. This effect was dramatically reduced in coatings 30 and 40.



ASR Stability – Coated and Uncoated T430SS



Coating XRD Patterns and Cross Section SEM Images:



Conclusions and Continuing Work:

Coating Composition and Thickness Matrices Reveal Balance Between Diffusion-Barrier and ASR Characteristics
 Further Work Will Focus on Coating Performance Optimization and Evaluation on Full-Scale SOFC(IC) Plates
 Comprehensive Economic Feasibility Analyses and Technology Transfer Considerations are Ongoing