NEXTECH MATERIALS

404 Enterprise Drive Lewis Center, Ohio 43035 (614) 842 6606 www.nextechmaterials.com

Interconnect Coating Technology

Ceramic Protective Coatings for Metallic Interconnects

It is well-established that metallic interconnects can provide significant cost advantages in SOFC applications. However, the chromium-containing ferritic stainless steel alloys that offer the most attractive manufacturing costs degrade during service.

Ceramic coating technologies have been demonstrated to mitigate this performance degradation. NexTech Commercial Services division has taken the lead in tailoring and demonstrating cost effective coating technologies, including new materials, coating processes and large-area component prototyping.

Prototyping & Manufacturing

NexTech's facility includes a range of laboratory, development and production scale aerosol spray systems. The coating materials and processes developed by NexTech leverage years of aerosol process development to tailor coating thickness, deposition speed and coating uniformity. Coating facilities include:

- An automated X-Y table with controlled dispensing for aerosol spray coating with a working area of 45 x 45 cm
- A computer controlled conveyor belt with ultrasonic aerosol deposition system for spray coating a working area of 10 x 10 cm
- Automated X-Y coating systems for coating tubular components
- Controlled ventilation and drying chambers

energize your opportunities

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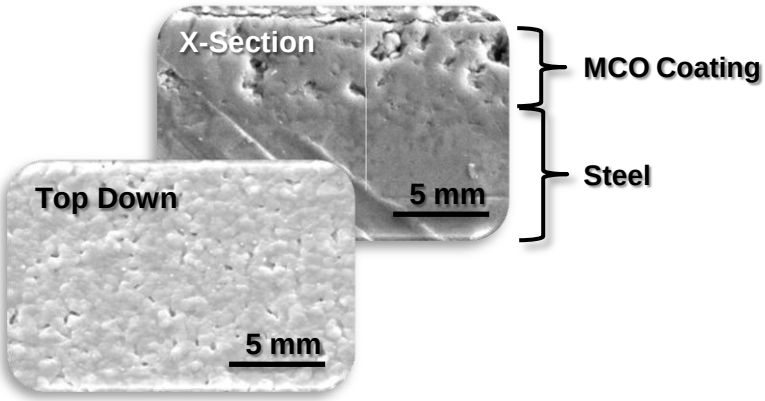


Tailoring Coating Microstructure

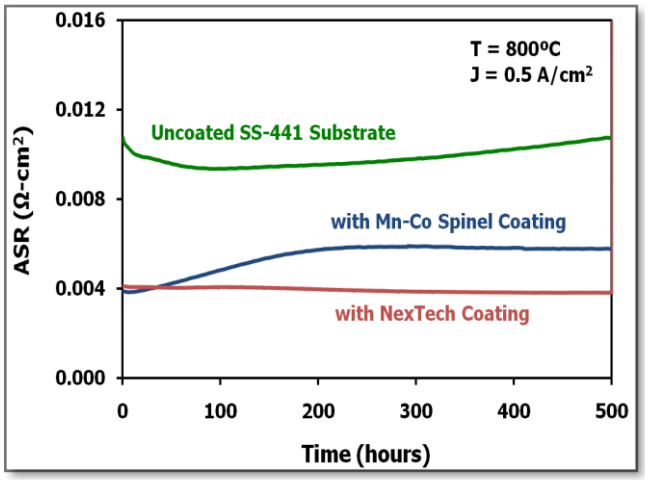
Effective protective coating must be uniform, and dense. To minimize resistance and materials cost, protective coatings should also be thin.

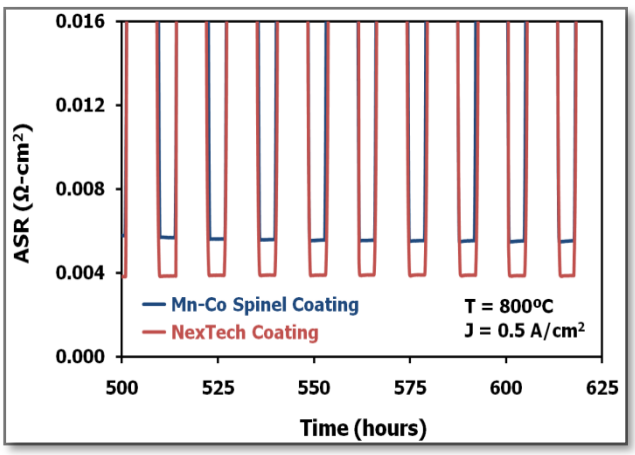
NexTech has invested in materials selection and processes development which provide thin oxide coatings with uniform microstructures. Coating thickness values as low as 5 μm (left) and as high as 40 μm have been demonstrated on a range of interconnect steels.

Unique Materials Design

NexTech's Commercial Service team provides customers with access to state-of-the art materials and processes as well as in-house testing that closes the development loop. This vertical integration hastens the innovation cycle, providing partners a competitive advantage in the race to commercialize.

Based on our experience in developing processes for IC coating, NexTech has recently discovered a new family of protective coatings that offer lower resistance than uncoated or Mn-Co Spinel coated stainless steel (left), when measured under constant current (0.5 A/cm^2) at 800 C in humidified air.





Thermal Cyclability

A critical performance requirement of any coating system be that the protective coating bond well to the metallic interconnect and remain adhered through rapid and repeated thermal cycles. As shown at right, both the MCO and NexTech protective coatings provide excellent thermal cyclability, demonstrating consistently low area-specific resistance as temperature is cycled between room temperature and 800 C at 3 C/minute in humidified air.

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