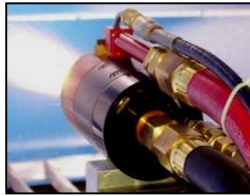




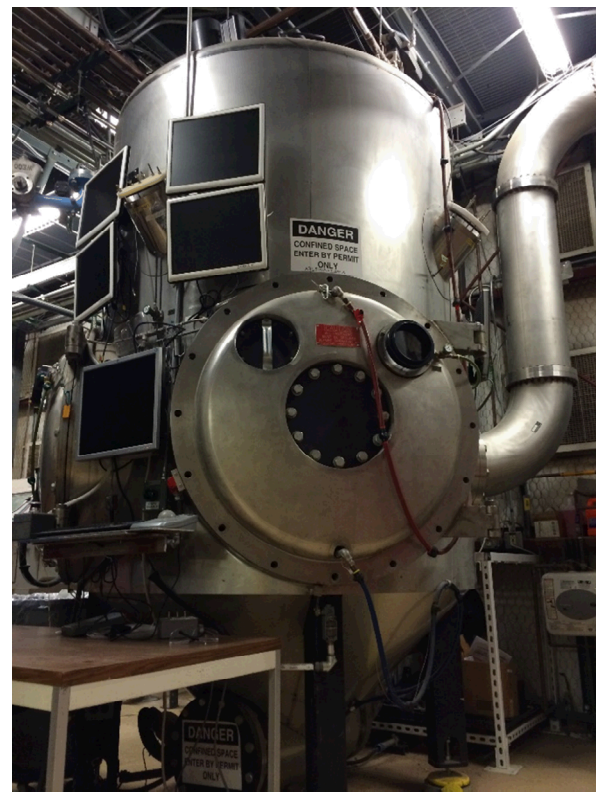
The TSRL operates at least one version of every major spray process

SAND2017-8520PE

Atmospheric Plasma Spray



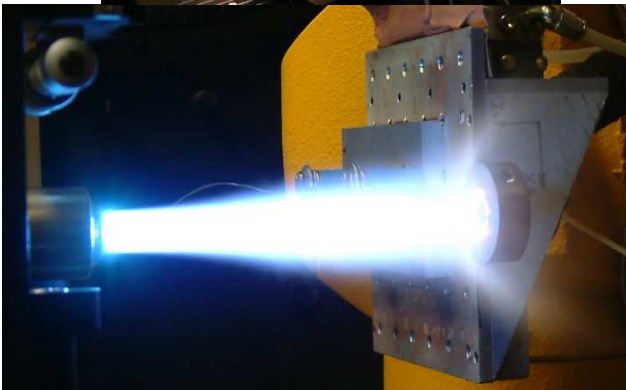
Vacuum, low pressure, and very low pressure plasma spray, Aerosol Spray Deposition



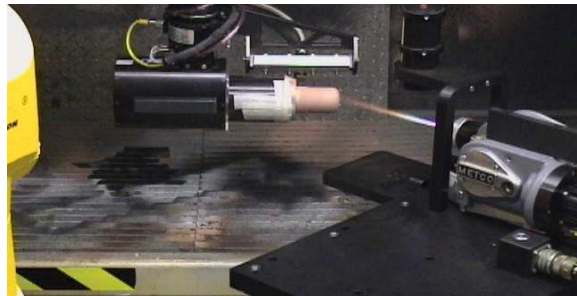
Cold Spray



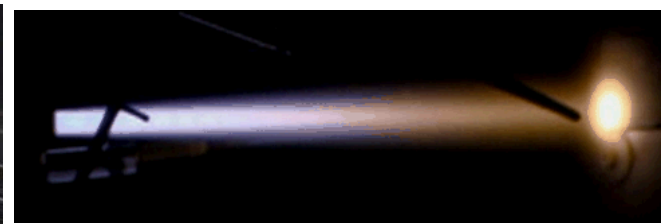
Twin Wire Arc Spray



Powder Flame Spray



Wire Flame Spray



HVOF

Slide 1

HD1

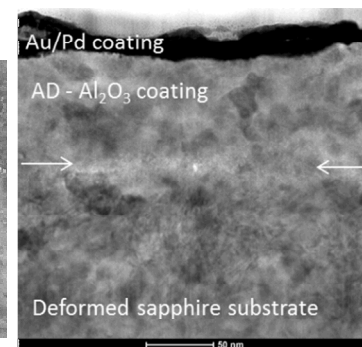
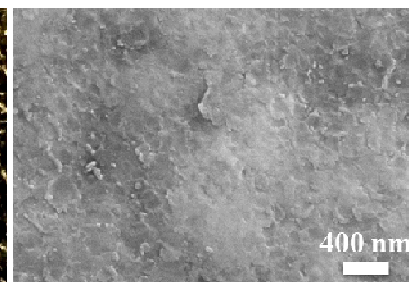
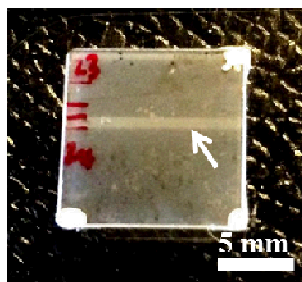
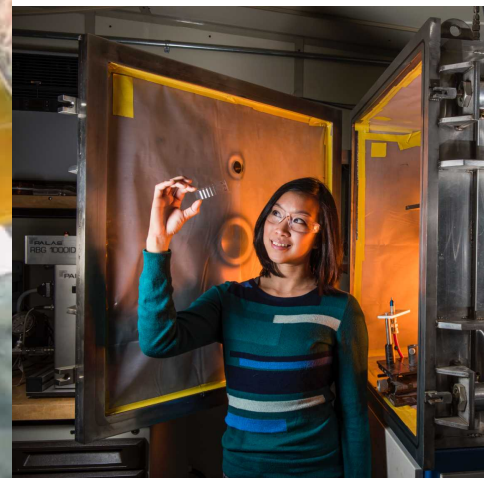
Do you want to include HVOF? We have a JP5000 but it isn't working, your call.

Hirschfeld, Deidre, 7/12/2017



Ultrafine-grained Ceramic Coatings using Aerosol Deposition

- Kinetic deposition of ceramics on substrates
- Process performed at Room Temperature
- Used to protect microelectronics
- Nano-crystalline films
 - Oxidation Protection
 - Wear resistance
 - Electrical Functionality



100-150 nm nanocrystalline AD- Al_2O_3 film on sapphire

Slide 2

HD4

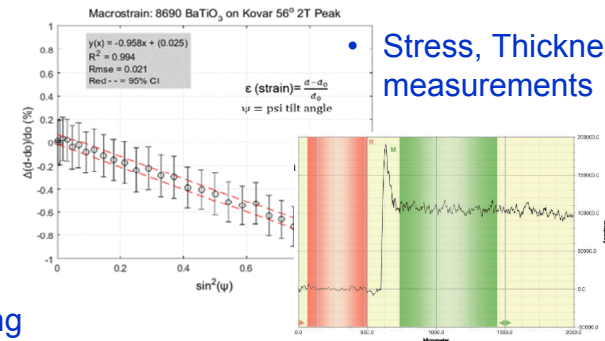
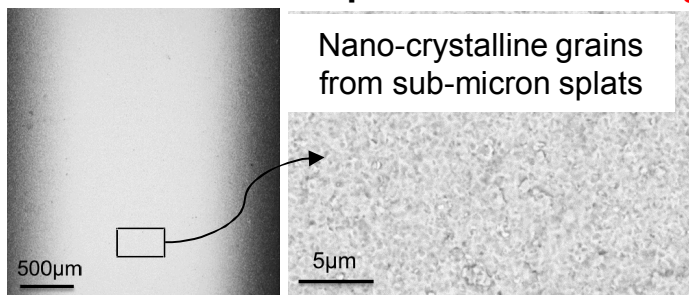
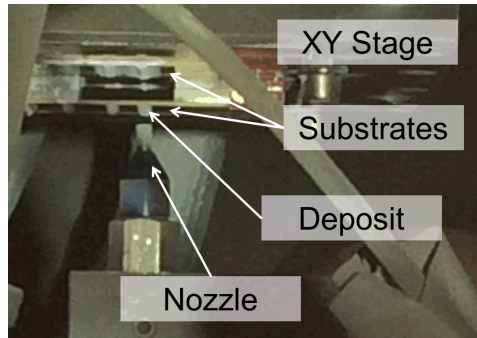
Looks good

Hirschfeld, Deidre, 7/12/2017



Maturation of Aerosol Deposition at Sandia

FY14-16 Initial Demonstration and Process Development → **Technology Maturation**

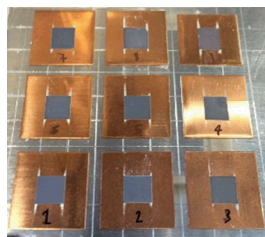


• Stress, Thickness measurements

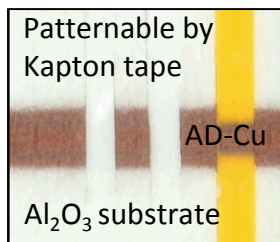
• Processing parameter exploration and SEM imaging

• Room temp. consolidation

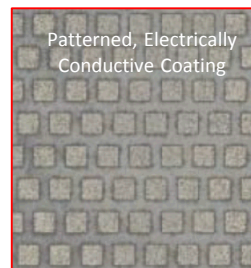
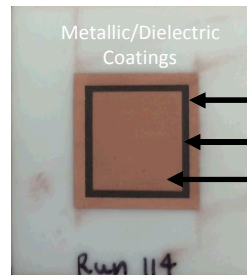
Expanding suite of materials and development for potential devices and applications



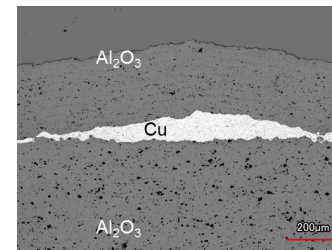
AD – BaTiO₃ on Cu Substrates



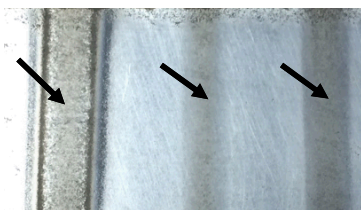
AD – Cu on Al₂O₃ substrate



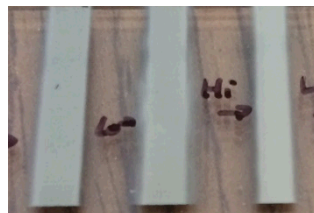
Ni interconnects



Embedded Electrical Traces



AD- HfC on W substrate



AD - Ni on Glass Substrate

- More matured AD process.
- Metallic, ceramic, compound coatings.

Slide 3

HD4

Looks good

Hirschfeld, Deidre, 7/12/2017