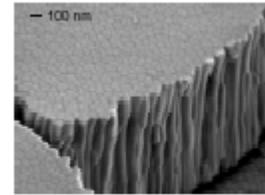


## IRG 1 - Thermal Spray for Nanoscale Plasticity Studies

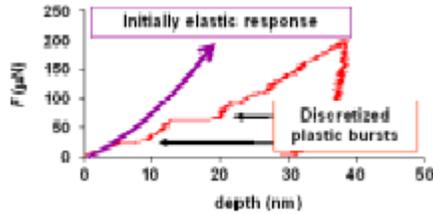
Nano-crystalline materials are of high technological interest due to their potentially high strength, ductility and toughness. The physics of nanocrystalline deformation is not fully understood, but recent advances in

nano-mechanical probes and numerical analyses have driven a growth spurt

in its study. Thermal spray, a well-established deposition technology, routinely deposits material in the form of 'splats' that typically exhibit



SEM image of a  $ZrO_2$  splat, showing columnar, nanocrystalline grain structure.



columnar grains of 10-200 nm diameter. In addition, the morphology, phase and residual stresses of splats can be controlled via selection of spray input parameters. At the Center for Thermal Spray Research, we have thus recognized the potential for a systematic nano-mechanical study, and are currently performing nano-indentation

experiments on a wide range of nano-crystalline splat materials.

### **Education - Reaching out to Elementary School Teachers**

Many elementary school level teachers often have limited knowledge of the advances being made in the various scientific and engineering fields. Their lesson plans, in turn, may not accurately capture the vast array of technological innovations coming from these fields and may demonstrate little enthusiasm for the sciences. CTSR faculty provide lectures on advances in thermal spray technology to K-12 teachers enrolled in SBU's School of Professional Development, a program designed to expand teachers field of expertise. **At right:** Visitors to the CTSR learn the science and implementation of spray processing.

"Now I understand how IMPORTANT it truly is for us to become knowledgeable on the subject of the sciences. The enthusiasm we possess in the classroom DOES play a large role on what the children take a liking to. Thank you for making me aware of the importance of us elementary school teachers to diversify the kids in the sciences at a young age", Jaclyn Mazzurco, elementary school teacher and student in School of Professional Development.



### **Education - WISE Day: Arc Sprayed Copper for Decorative Surfacing**

Dr. James Quinn, Director of Laboratories in the Materials Science Department, serves as coordinator of the Women in Science and Engineering (WISE) program. CTSR staff work closely with the students during their research rotations, allowing them first-hand experience with various thermal spray technologies. The lab participates in these research rotations throughout the year. 10th and 11th grade high school members of WISE spend the day at the CTSR learning about the various thermal spray processes. The girls have the opportunity of working in a spray booth, creating decorative signs and coatings, highlighting their lab experience. **At right:** high school WISE members showing off their copper sprayed sign and the twin wire electric arc torch which was used to create it.

