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Title: "Hybrid aerosol deposition process: bridging the gap between thermal spray and vapor deposition processes"

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Abstract:
Hybrid aerosol deposition (HAD) process is a kinetic spray deposition process of solid particles with the enhancement of particle surface by a mesoplasma jet. HAD can deposit dense ceramic coatings to porous ceramic coatings of which thicknesses are about a few micrometer to a hundred micrometer. Impacted particles are mainly deposited with a phenomenon called a room temperature impact consolidation. The starting powder particle size ranges sub micrometer to micrometer, which is much smaller than that of conventional ceramic plasma spray (a few tens of micrometer). On the contrary, in physical vapor deposition, deposition unit is an atom or a cluster (angstrom to nanometer scale). Therefore, the deposition unit of HAD comes in the middle size, and the deposition process of HAD can also be regarded between thin film technology and thick film technology. This difference can indicate some interesting points. For example, the surface roughness of the substrate is an important factor. In thermal spray, the substrate is grit-blasted before spraying, while in physical vapor deposition, the substrate is usually flat. Then, what is the suitable substrate surface for HAD process? In this presentation, we would like to discuss the size effect of deposition unit on the coating deposition process. Based on the current understanding of HAD process, vapor deposition, cluster deposition, aerosol deposition, and melt quenching deposition will be compared.

Biography:
Dr. Kentaro Shinoda is the Leader, Advanced Functional Surface Group of the Advanced Manufacturing Research Institute at the National Institute of Advanced Industrial Science and Technology (AIST), Japan. He received his Ph.D. in Engineering from the University of Tokyo in 2006. After two postdoctoral fellowships at the National Institute for Materials Science (NIMS) and the Center for Thermal Spray Research (CTSR) at Stony Brook University, Dr. Shinoda joined in AIST in 2011. His research interest is on the coating deposition process widely from chemical solution to kinetic spray to plasma spray depositions. Especially, he has developed a hybrid aerosol deposition process and try to expand its applicability to industrial research fields. He is also appointed as an Adjunct Professor at Shibaura Institute of Technology. He serves as the member of the director board of the Japan Thermal Spray Society and the member of ASM Thermal Spray Society Programming Committee.