COMBUSTION WEBINAR

Flame Synthesis of Nanomaterials

Speaker: Prof. Stephen D. Tse, Rutgers University—New Brunswick, Piscataway, NJ, 08854, USA

Time: *10:30 NYC*, Tue Jan 31 2023
23:30 Beijing; 16:30 Paris

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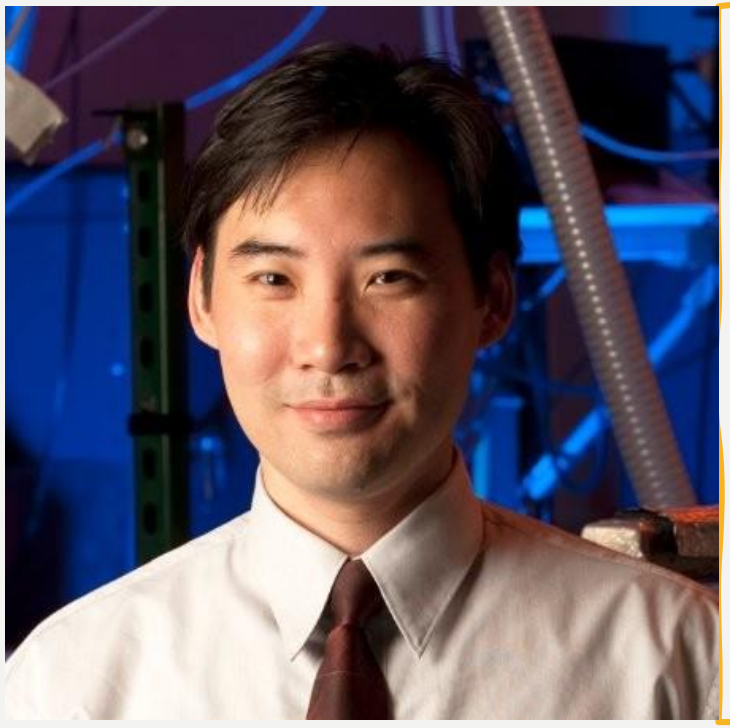

Biography: Stephen D. Tse is Professor and Graduate Program Director in the Department of Mechanical and Aerospace Engineering at Rutgers University—New Brunswick. His focus is in the thermal sciences, involving applications in nanomaterials synthesis, microgravity processes, combustion and propulsion, and advanced laser-based diagnostics. His research methodologies encompass experimentation; computational simulation of complex flows, chemistry, and molecular dynamics; and mathematical analysis. He has designed experiments and diagnostics that have flown on the Space Shuttle and the International Space Station. Prof. Tse received his B.S.E. in Engineering Physics from Princeton University in 1991 and his M.S. and Ph.D. in Mechanical Engineering from the University of California at Berkeley in 1994 and 1996, respectively.

Abstract: Flame synthesis of materials has demonstrated a history of scalability and offers the potential for high-volume commercial production at reduced costs. Flame synthesis can produce a multitude of nanomaterial morphologies (from zero-dimensional nanoparticles to one-dimensional nanotubes/nanowires to two-dimensional graphene to higher-dimensional structures such as nanolayered and nanoporous films) and compositions (mainly in carbon-based or oxide form). Here, flame synthesis of ceramic oxide nanoparticles, semiconducting metal-oxide nanostructures, carbon nanotubes, and graphene will be presented.

Different burner configurations and key processing parameters will be discussed for the synthesized nanomaterials. In-situ laser-based diagnostics for the characterization of the flame synthesis flow field and the nanomaterials themselves are also presented, with emphasis on determining fundamental mechanisms, as well as possible use as in situ monitoring with feedback control of input parameters for reproducible production of tailored nanomaterials.

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