

GTPRIND Colloquium

Georgia Institute of Technology

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G. W. Woodruff School Nuclear & Radiological Engineering and Medical Physics Programs

“Hydrodynamics and Interfacial Phenomena in Separations of Nuclear Materials”

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MARC Building, Room 114

11:00 am to 12:00 noon

Abstract:

There are several processes in the nuclear fuel cycle either in uranium mineral processing and enrichment, or in spent nuclear fuel reprocessing, or even in nuclear waste treatment, where separations play a central role. The most common chemical separation process is undoubtedly solvent extraction, which involves two liquid phases in intimate contact. In this process, molecules of an extractant chemical species in an organic solvent selectively react with ions in an acid solution to form an organic-soluble complex. Liquid-liquid extraction usually occurs either in column contactors or in mixer/settlers. Particularly for radiological materials, a centrifugal contactor allowing both mixing and phase separation in a single unit operation can also be employed. Hydrodynamic and transport phenomena in extraction processes will be reviewed, and recent work using a centrifugal contactor will be discussed. Furthermore, with respect to the separation of radioactive particles by filtration or sedimentation, interfacial effects of radioactivity and their implications in separations of such particles will be discussed.

Biosketch:

Costas Tsouris received his Diploma of Engineering from the Aristotle University of Greece in 1984 and his M.S. and Ph.D. degrees in Chemical Engineering from Syracuse University in 1988 and 1992, respectively. He was then a Postdoctoral Fellow in the Chemical Technology Division of Oak Ridge National Laboratory. Since 1994, he has been working as a Staff Member at Oak Ridge National Laboratory, and since 1997, he has been serving as an Adjunct Faculty with the School of Civil and Environmental Engineering at Georgia Tech. Since 2003, he has been working as a Joint Faculty between Oak Ridge National Laboratory and Georgia Tech, primarily in the Environmental Engineering Program. He taught a course focused on energy and sustainability for three years, and focused on research in nuclear energy, alternative energy, and interfacial phenomena. More recently, he focused on process intensification, an engineering strategy of making dramatic reductions in the size of unit operations in order to reduce capital cost, footprint, inventory, energy needed, and raw materials. Costas Tsouris published over 100 journal articles and holds 5 patents.

Refreshments will be served. For further information, please contact Professor Nolan Hertel
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