

The University of Texas at San Antonio

UTSA Physics and Astronomy

Friday, February 23, 2024 at 11:00 AM, AET 0.204

Beyond TRISO: Development of Coated Particle Fuel

Dr. Eddie Lopez-Honorato

Oak Ridge National Laboratory

Traditional TRI-structural ISOtropic fuel particles (TRISO) are composed of three layers of pyrolytic carbon (PyC) and one of SiC, produced by fluidized bed chemical vapor deposition (FBCVD). Although initially developed for high-temperature gas-cooled reactors, other coated-particle fuels have been proposed for future microreactor designs for terrestrial use and space exploration. The expanded range of operating conditions resulting from some of these new applications requires the fabrication of coated-particle fuels with a wide variety of kernel compositions (oxides, carbides, or nitrides), kernel sizes (200–800 μm), coating kernel charge (tens of grams to kilograms), as well as differences in the number of coating layers, coating thickness, and coating compositions (e.g. PyC, SiC, ZrC, W, ZrN, etc.). Each of these variables requires modification of not only the deposition conditions but also the FBCVD system to produce coatings with optimal performance. In this talk, we discuss addressing the challenges associated with the development of new coated particle fuels using experience from the Advanced Gas Reactor (AGR) Fuel Development and Qualification Program in the United States, as well as the use of additive manufacturing, image analysis, computational fluid dynamics, data mining, and machine learning to accelerate the development of new coated particle fuels.



Bio: Dr. Eddie Lopez Honorato received his B.Sc. in Chemistry from the National Autonomous University of Mexico (UNAM) in 2002. He completed his M.Sc. and Ph.D. in Materials Science at the University of Manchester, UK, in 2003 and 2008, respectively. Before joining Oak Ridge National Laboratory in 2020, he worked as a Research Associate at the University of

Manchester, UK, a Research Fellow at the European Commission/Institute for Transuranium Elements, Germany, and a Research Scientist at the Centre for Research and Advanced Studies (CINVESTAV), Mexico. Among other activities, Dr. Lopez-Honorato has graduated 17 graduate students and is a member of the Executive Committee of the Aerospace Nuclear Science and Technology Division of the American Nuclear Society and a member of the Editorial Advisory Board of ACS Applied Engineering Materials. Dr. Lopez-Honorato's current research focuses on developing ceramic materials for nuclear applications and extreme environments, including TRISO, particulate nuclear fuels, environmental barrier coatings, polymer-derived ceramics, graphene oxide, and superhydrophobic ceramic coatings. Dr. Lopez Honorato is a senior R&D staff member and the PI on the fabrication of coated particle fuels at ORNL.

Faculty Host: Dr. Arturo Ponce

Email: Arturo.Ponce@utsa.edu