SDSU College of Engineering Mechanical Engineering

Mechanical Engineering Seminar Series

September 9th, 2025, 11:00AM

Dean's Conference Room, E-203E

Title: Flame Deposition of Graphenic Nanomaterials: Gas-phase Precursors and Carbon Nanostructure

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Abstract: Premixed flames hotter than 2000 K have been shown to be a unique reacting flow environment that may provide a pathway for production of graphene, tars and other valuable carbon materials. New experimental observations will be presented for depositing carbon nanomaterials with structures ranging from amorphous, graphenic and traditional soot. Graphene ribbons and nanoparticles with few layers are observed by electron microscopy for carbon films deposited from the flame over time. Formation of oily amorphous carbon agglomerates is also observed which may be due to condensation of excess carbon precursors. New characterization of gas-phase precursors in the flame by gas chromatography- mass spectrometry provides a basis for developing precursor chemistry leading to carbon nanomaterial formation. Knowledge of potential chemical pathways for amorphous vs. graphenic particle formation could enhance selectivity towards desired carbon nanomaterials.

Brief Bio: Joaquin Camacho is an associate professor in the Mechanical Engineering Department at San Diego State University. His research includes soot formation, carbon materials and gas-to-particle synthesis processes. Current projects include an NSF CAREER award to study fundamental processes of carbon nanoparticle formation in high-temperature flames. Prof. Camacho obtained his BS from UC San Diego, PhD from University of Southern California and Postdoctoral Fellowship at Stanford University.