UNIVERSITY OF RHODE ISLAND
Department of Chemistry
SEMINAR

Room 105 Beaupre Center
3:00 p.m, Wednesday, December 4, 2019

Dr. Elias Nakouzi

PNNL

"Nanocrystal Aggregation, Attachment, and Assembly"

HOST

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Nanocrystal Aggregation, Attachment, and Assembly

One of the challenges of modern physical chemistry is to build a predictive understanding of nanomaterial growth, attachment, aggregation, and assembly. To resolve these distinct pathways, we need to determine how particles diffuse and interact in solution. Using a repertoire of microscopy, scattering, and simulation methods, we investigate these questions in three systems: 1) Zinc oxide nanocrystals attract by dipole-dipole forces and fuse into larger crystals. 2) Aluminum oxyhydroxide nanoplatelets form aggregates whose shape depends on the solution conditions. 3) The crystallization of metal carbonate and silica assembles thousands of nanorods into “life-like” microstructures reminiscent of --- and easily mistaken for --- primitive fossils. These results demonstrate the wealth of outcomes in nanocrystal-solution systems, with immediate relevance to problems in geochemistry, environmental management, materials science, and beyond.