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MSE 690 SEMINAR SERIES

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“Harnessing the Kirkendall Effect: Compositional, Thermal and Geometrical Influences”

Abstract: The Kirkendall Effect was first discovered in 1947 and established vacancies as a primary diffusion mechanism. Essentially it is related to an imbalance of atomic fluxes of two diffusing species and, as a result, leads to a net flux of vacancies in one direction. Due to a local supersaturation, these vacancies often coalesce and form so-called Kirkendall pores. Typically, these pores are considered detrimental because they degrade the mechanical, electrical, and thermal properties of materials, especially near interfaces. However, recent work has demonstrated that under certain conditions, the Kirkendall Effect can be utilized as a novel route to create hollow structures. This talk will discuss a variety of factors that influence Kirkendall pore formation and evolution in Ni-based wire systems. Both traditional ex situ metallography and in situ X-ray tomography were used to characterize the porosity and assess the feasibility of using this technique as a hollowing method.

Biography: Prof. Paz y Puente has been an assistant professor at the University of Cincinnati since 2016 after graduating with her Ph.D. from Northwestern University. Her primary research interests are phase transformations, diffusion, coatings, and metal additive manufacturing. Her current NSF funded project combines all of these topics to fabricate 3D printed Ni-based scaffolds via a decoupled printing and alloying approach using particle-based ink extrusion and pack cementation. She also recently received an NSF CAREER award to further investigate the different factors influencing the Kirkendall Effect. On a more personal note, her husband is also a materials professor at UC which makes for interesting dinner conversation, she has three kids who are all boys under five years old, and she has two black lab mix dogs named Boss and Ava.



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