**Special Seminar**

Department of Materials Science & Engineering

# Wednesday September 12, 2018

1:30 – 2:30 ~ Ferris Hall 405

"Manganese Effect on Higher Vacancy Concentration of High-Entropy Alloy, Comparing CoCrFeNi & CoCrFeMnNi with Pure Cu"

Speaker: **Dr. E-Wen Huang**, Associate Professor

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Abstract:

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CoCrFeMnNi, Cantor Alloy, is the fundamental high entropy alloy of a huge number of researches. For potential applications, a detailed knowledge of the properties of vacancy in Cantor Alloy is highly desirable. On the other hand, the volatilization of Manganese is quite different than the other elements of Cantor Alloy. In particular, the views on the vacancy concentration & associated formation enthalpy & entropy are not easy to decouple the high entropy and Manganese effects. However, to date there has few experimental evidences to distinguish the high entropy effect on vacancy. Here, using copper as bench-mark in comparisons with CoCrFeNi and CoCrFeMnNi high entropy alloys, we applied Seeger’s methods, positron measurements, & neutron and synchrotron x-ray diffraction experiments to characterize the vacancy & to estimate corresponding formation enthalpies & its associated entropy of point defects in high entropy alloys. In difference from traditional ordered alloys, the vacancy formation enthalpies of both CoCrFeNi & CoCrFeMnNi high entropy alloys are lower than other fcc metals. This fact implies that the formation of vacancies is easier, which relax the high entropy alloys at elevated temperatures.

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Biography:

A E-Wen Huang obtained his B.S. in Chemical Engineering from Chang Gung University, Taiwan. He earned his first master degree in Materials Science & Engineering from National Dong Hwa University with the President Award of Engineering School. He earned another master degree in Industrial Engineering from Texas A&M University, USA. He obtained his Ph.D. degree from University of Tennessee (UT) with an Award of Professional Promise of Chancellor’s Honors, 2009. He is a recipient of Ludo Frevel Crystallography Scholarship Award from the International Centre for Diffraction Data for his PhD thesis research. He & been working in the areas of neutron & synchrotron characterizations of structural alloys & composites. After graduation, he joined the faculty as an assistant professor in the Department of Chemical & Materials Engineering at National Central University (NCU), 2010. Since joining NCU, his research interests include pegylation & piezoelectric polymers. After working at NCU for four years, he joins the faculty & becomes an associated professor in the Department of Materials Science & Engineering at National Chiao Tung University (NCTU). He is also an adjunct senior researcher of the Industrial Technology Research Institute (ITRI).