## Abstract Submitted for the SHOCK13 Meeting of The American Physical Society

Pressure-Induced Valance change in Ytterbium Organometallic Molecule Cp<sup>\*</sup><sub>2</sub>Yb(4,4'-Me<sub>2</sub>-bipy) and Ytterbium intermetallic YbCuGa FARZANA NASREEN, DANIEL ANTONIO, ANDREW CORNELIUS, University of Nevada, Las Vegas, CORWIN H. BOOTH, Lawrence Berkeley National Laboratory, MILTON S. TORIKACHVILI, San Diego State University, San Diego, YUM-ING XIAO, Advance Photon Source, Argonne National Laboratory, Argonne, Illinois — We report on high pressure (0-15.3 GPa) x-ray absorption measurements in partial fluorescence yield mode (PFY-XAS) on two different kinds of Kondo systems - an organometallic molecular system  $Cp_2^*Yb(4,4)$ -Me<sub>2</sub>-bipy) [Cp<sup>\*</sup> = C<sub>5</sub>Me<sub>5</sub>, bipy =  $(NC_5H_4)_2$  and Me = CH<sub>3</sub>] and an intermetallic YbCuGa system. In the organometallic system, similar to the mixed valency in intermetallic Yb Kondo systems, the CASSCF calculations indicate that the intermediate valence in the ground state is due to a configuration interaction between the open-shell  $[4f^{13}\pi^{*1}]$  and the closed-shell  $[4f_{\uparrow\downarrow}^{14}\pi^{*0}]$  spin-singlet states. Our analysis for Cp\*<sub>2</sub>Yb(4,4'-Me<sub>2</sub>-bipy) shows that with increase in pressure the overall valency increases from 2.77 at 2.7 GPa to 2.97at 15.3 GPa. A considerable change in the slope of valency as function of pressure is observed at  $\sim 3.26$  GPa suggesting a valance transition. The Kondo effect in such molecular compounds is intrinsic and provides a well defined nanoscale system to test the effect of size on the strongly correlated behavior. In the YbCuGa bulk system, the increase in pressure delocalizes the system and pushes it from valency of  $\sim 2.68$  at ambient pressure to  $\sim 2.9$  at 14.0 GPa.

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