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X-ray absorption studies and f-level occupancy in the $Ce_2Rh_{(1-x)}Ir_xIn_8$ intermetallics.

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Within the series of heavy fermions $Ce_2Rh_{(1-x)}Ir_xIn_8$ intermetallic compounds it has been observed the occurrence of two low-temperature superconducting (SC) phases as a function of temperature both at ambient and applied pressure for Ir-content (x = 0, 0.25-0.70). Remarkable different behaviour of both states were observed [1] which seems to be reminiscent of the SC phases found in the $CeRh_{(1-x)}Ir_xIn_5$ system [2]. The SC phases in the title compounds appear for smaller x ranges, which has been associated to its higher dimensionality and structural disorder. In this work, we have performed EXAFS (X-ray Absorption Fine Structure) and XANES (X-ray Absorption Near Edge Structure) measurements in the series $Ce_2Rh_{(1-x)}Ir_xIn_8$ (x = 0.00, 0.25, 0.50, 0.75). We aim at shading light into the relationship between the local atomic order and the interesting ground states previously observed [1]. The experimental data were obtained for the Ir (L_3), Rh (K) and Ce (L_3) absorption edges at the Brazilian Synchrotron Light Source (LNLS). Our results have been analysed by using FEFF and IFEFFIT codes and they suggest that there is no evidence for the presence of local structural disorder until de lowest temperature measured (10K). This is contrary to what has been suggested, however sample inhomogeneities (Rh clustering) and changes in the Rh/Ir stoichiometry could be responsible for the smaller doping range where SC were observed. XANES data reveals that Ce valence is 3+ over the entire studied T interval. Preliminary results of EXAFS data under pressure of up to 20 kbar (recently collected) will be presented and compared to the ambient pressure EXAFS data. They will be discussed in the light of the results of the phase diagram previously observed [1].

[1] Hering, E. N. *et al.* Phys. Rev. B, 82, p. 184517 (2010).
[2] Nicklas, M. *et al.* Phys. Rev. B, 70, 020505 (2004).

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