

**Experiment title:**Photoemission from Ce3d core **levels in a wide photon energy range.****Experiment number:**
HC-170**Beamline:**

6

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Report:

In the application of photoemission to the study of correlated systems one serious limitation comes from the difficulty in disentangling the information of the bulk from that of the surface. This is a very crucial issue if one wants to compare electron spectroscopy with chemical and thermodynamical properties. In particular this is relevant in Cerium compounds which are known to have different Ce character at the surface (more y-like) from the bulk (more a-like). This work is the first effort at the ESRF along this direction and is based on a wide set of measurements of Ce3d photoemission taken at two BL's (26 and 6) in order to cover a wide excitation range from -1KeV upto nearly 4 KeV. This gives a variation in the kinetic energy of the photoelectrons from -150 eV (surface sensitive) upto nearly 3000 eV (bulk sensitive) for the photon energy range used. The results for CeFe₂, CeCo₂, CeNi₂ and Ce₇Ni₃ are summarised in the figure and give a very clear evidence of the transition to the bulk. This allows for the first time to recover without ambiguities the bulk information. In the strongly hybridized compounds of the type CeTM₂ the bulk hybridization is immediately evident and is higher than seen up to now. The implications of these results will be discussed in the frame work of an impurity model, also in order to point out possible limitations of the model itself.

Figure 1:

Cerium 3d core level photoemission spectra for several CeTM compounds over a wide photon energy range.

