ESRF	**Experiment title: Elastic instability in the intermetallic compound YCo5**	**Experiment number**: HS 2379
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Shifts: 12	**Local contact(s)**:M. Hanfland	*Received at ESRF:*

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Report:

The experimental data have been completely analysed. The run at 140 K (see Fig. 1) shows that the predicted isostructural phase transition at high pressures is not only associated with a discontinuous change of volume, but also with a previously unpredicted anomaly of the *c*/*a* ratio. Using electronic structure calculations we show that this transition is driven by magnetic interactions: YCo_5 changes from strong ferromagnetism (Co-like) to weak ferromagnetism (Fe-like) and thus exhibits a new type of isostructural transition.

The experimental finding of the *c*/*a* anomaly stimulated new and more precise full-potential band-structure calculations which confirm the experimental finding of a drop of the axial ratio. Moreover, for higher pressures the calculations predict that *c*/*a* of the low-spin phase increases again. Measurements to even higher pressures would thus confirm the magnetic nature of the phase transition more reliably.

The analysis of runs performed at higher temperatures (ambient) also demonstrated that the effects associated with the transition sharpen with decreasing temperature. Thus, we would use

the opportunity of additional measurements to perform a complete run at even lower temperatures, e.g., at 100 K which is the lower limit of the cryostat.

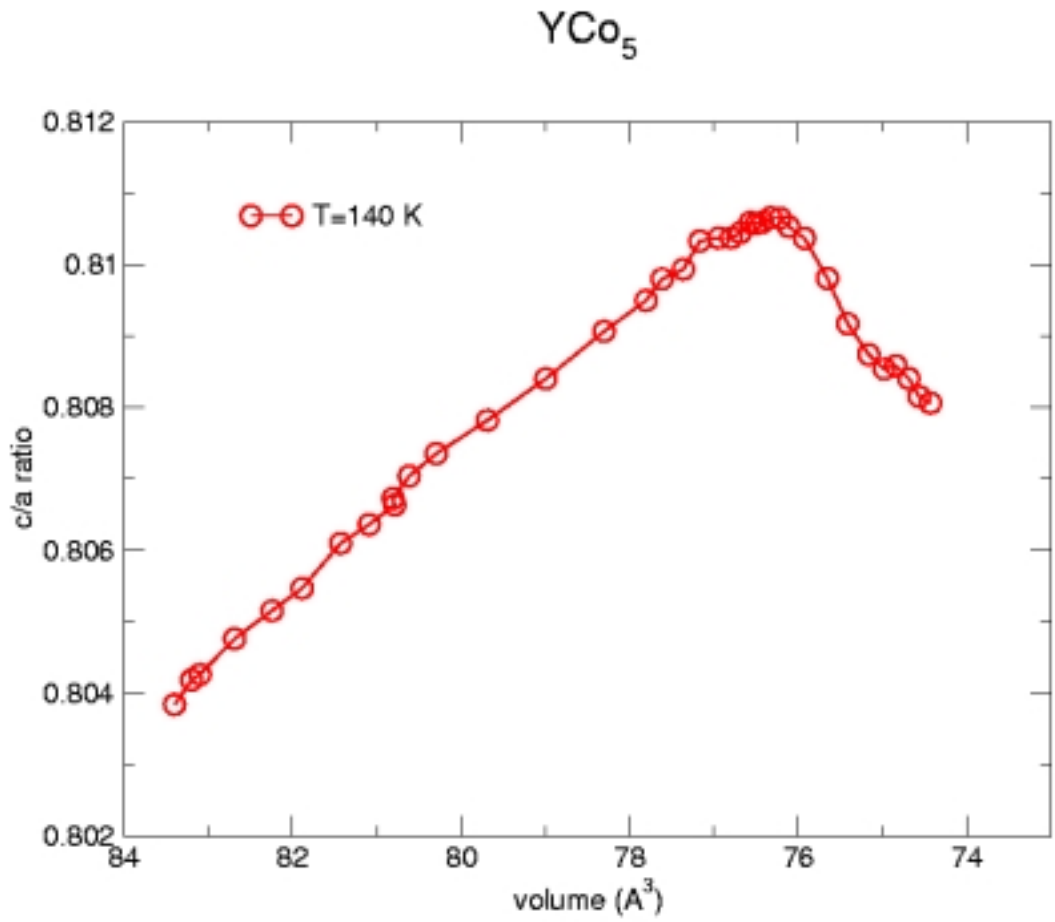

Fig. 1. *C*/*a* ratio of the intermetallic compound YCo_5 as a function of volume. The data clearly evidence that the predictic magnetic transition is associated with a small eleastic anomaly which shows in the change of the axial ratio at volumes below 77.5 A^3.