ESRF	**Experiment title:** Initial growth and chemical order of epitaxial FePd : bilayer growth.	**Experiment number:** SI-515
Beamline: BM32 / SUV	**Date of experiment:** from: Sept 8, 1999 to: Sept 14, 1999	**Date of report:** 29-02-2000
Shifts: 18	**Local contact(s):** A. Barbier, G. Renaud	*Received at ESRF:* - 3 MAR. 2000

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Report:

Several weeks were devoted to the preparation prior to the experiment. Several Pd/MgO(001) buffer layers were prepared using our laboratory MBE equipment, in order to use them as substrates for the accurate calibration, using the RHEED oscillation technique, of the molecular fluxes of the Pd and Fe sources in the ESRF/SUV chamber.
In parallel, several MgO(001) substrates of very high quality were prepared using ion etching at 1500°C followed by annealing under low oxygen pressure. They were intended to be used to grow the Pd(001) buffer layer onto which the FePd growth will be done.

However, despite this preparation, various technical problems were encountered, that prevented us from getting reliable results :

1- The first evaporation bars to evaporate Fe, which were prepared in our laboratory, happened to be of poor purity, with C and N impurities. This implied re-opening the X-ray chamber and hence re-baking and degasing of the chamber a few days before the experiment. As a result, the bakeout of the chamber was not long enough, and the vacuum was only in the low 10^{-10} mbar with a large CO background pressure instead of the low 10^{-11} mbar expected.

In addition, time was no longer available to properly degas a Pd molecular source which has to be operated at high temperatures (1400 °C). It should be pointed out that the Fe-Pd system is very sensitive to oxygen and carbon contamination.

This resulted in rapidly decreasing RHEED oscillation during growth of FePd by coevaporation, which indicated a much larger surface roughness than during growth in our laboratory MBE chamber, inadequate for the foreseen measurements.

These problems have since been solved, and the SUV chamber has since been fully reconditionned. It reaches routinely a base pressure lower than 2×10^{-11} mbar after a 2-day-long bakeout.

2) The sticking of the specimen onto the substrate holder, which is done with In (convenient for RHEED and GIXD), failed several times after several thermal annealing because the surface of the molybdenum substrate holder, had been re-polished several times and was not flat enough.
This problem has since been solved by re-machining all sample holders, and the sticking of MgO substrates with In has seen been successfully tested : it holds even after repeated high temperature annealings.

In summary, the foreseen measurements failed because of different technical problems. All these problems are now solved.