The aim of the proposed experiment was to investigate the dynamics of the de-alloying process of Fe-Au metastable nanoclusters in silica during heating in controlled atmosphere. Despite the fact that the Fe and Au species are immiscible in the bulk phase, Fe-Au alloy nanoclusters can be obtained by sequential ion implantation of the two species in silica. The EXAFS spectroscopy performed at Fe K-edge and Au LIII-edge monitored the Fe-Au and Fe-Fe coordinations during the de-alloying and the possible presence of Fe oxidized phases at different time interval of annealing.
The preliminary EXAFS analysis shows that:

- The Fe-Au alloy clusters are formed upon Au+Fe ion implantation at room temperature; at the same time, a relevant part of Fe is dispersed into the matrix and oxidized.
- The heating in reducing atmosphere for 1h determines a cluster growth and, for temperature higher than 600 C, a de-alloying; the Au-Fe clusters separate into Au and Fe single-metal clusters.
- The alloy nanoclusters exhibit a deviation from the virtual crystal approximation, as expected for solid solution alloy.
- Upon heating in reducing atmosphere the Fe-O coordination is present up to T=600C; at higher temperature, mainly the metallic phases are detected.

Data analysis is still in progress, in particular to investigate if chemically ordered Fe-Au alloy are present; moreover, a possible correlation between the local structure around dopants during heating and the corresponding magnetic properties of the system has to be investigated.