ESRF	**Experiment title:** Glass forming ability and thermal stability of BMG's based on common metals	**Experiment number:** 16-01 752
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Report:

Two different kind of metallic glasses have been studied, an iron-based and a palladium-based glass. The first one is a series of an amorphous steel in which some of the iron is substituted by Mo:$Fe_{71.2-x}CSiBPCrAlMo_x$ ($x = 0, 4.5, 6.5$ $at\%$) labelled as L6, L7 and L8, respectively. The composition that presents a better glass forming ability is the one with medium content in Mo (L7) and in order to understand this phenomenon the samples have undergone different heating treatments in order to induce a structural relaxation. The first treatment (HT1) is at a temperature 100 degrees below the glass transition temperature (T_g) while the secon (HT2) is at around T_g. The position of the maximum of the first sharp diffraction peak gives information about the mean atomic volume. The obtained results can be seen in Figure 1 where can be observed how the L7 sample presents the larger variation in the mean atomic volume after the first heat treatment.

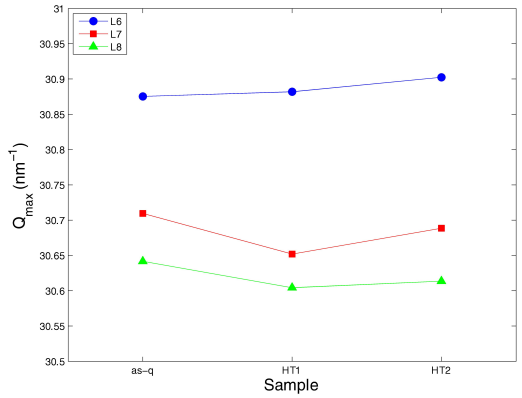

Figure 1. Evolution of the position of the first sharp diffraction peak as a function of the heat-treatment.

The second metallic glass studied has been the $Pd_{77}Si_{16.5}Cu_{6.5}$ bulk metallic glass. A rod of 1 mm in diameter was produced by arc melting and copper mould casting and two discs were cut in both extrems of the rod in order to check the existence of a possible gradient in the quenching rate along the vertical axis of the rod. Previous results (see report on the experiment 16-01 754) showed that one extrem was crystalline (the one closer to the arc in the furnace) and the other one was amorphous. Now we studied the crystallization process of both discs at a rate of 40 K/min in order to see if the presence of crystalline particles can induce a different crystallization process. The heating was performed in a linkam furnace up to its maximum temperature of 600 °C and the obtained diffractograms can be seen in Figure 2. It can be observed how the crystallization process is different and the appearance of some metastable phases at intermediate temperatures.

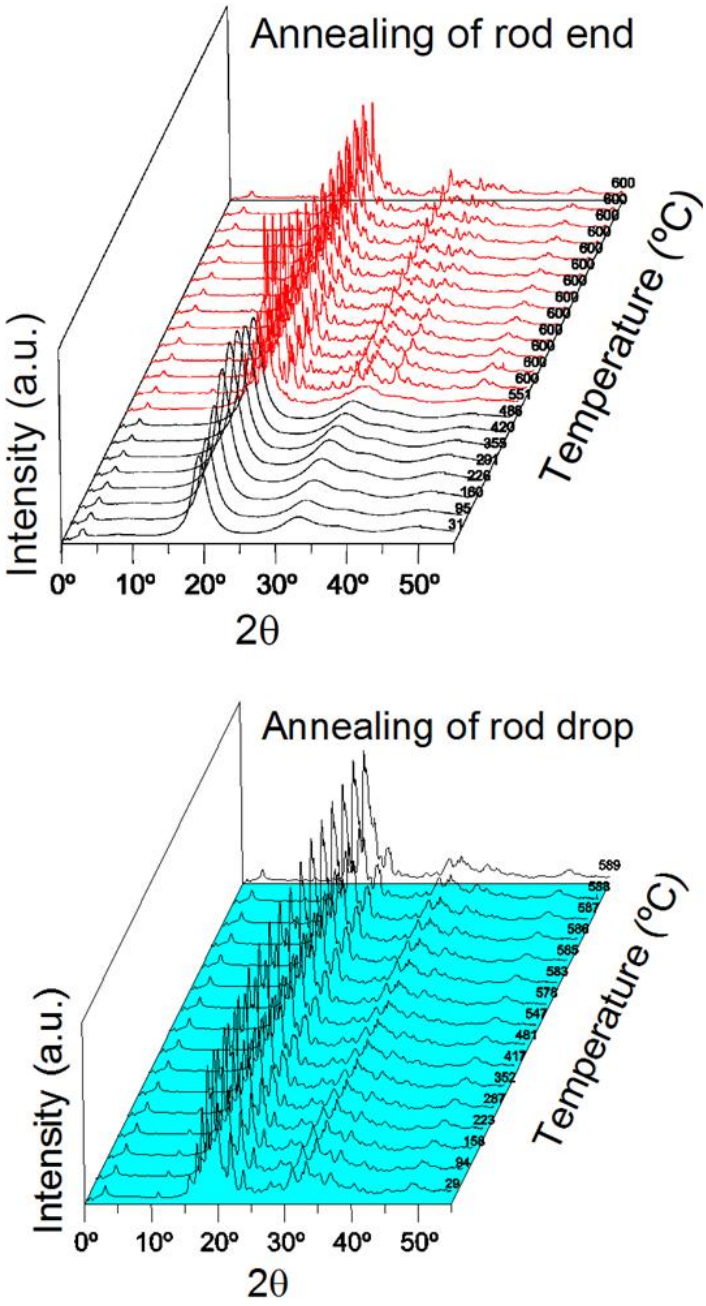

Figure 2. Crystallization process of both PdSiCu discs.(Top) Far end of the rod; (bottom) drop end, close to the arc