

GROWTH AND CHARACTERIZATION OF *AuAlYb* AND *AuGeYb* QUASICRYSTALS AND APPROXIMANTS

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Abstract

Quasicrystal (QC) materials, discovered in 1984 by Schechtman et al., are classified as the third kind of the solid compounds. They present diffraction symmetries that are not allowed to crystals, due to their long-range quasi-periodic structures. This class of metal alloys is very fascinating and their properties are still not well understood. In the last years, since the discovery of quantum criticality in *AuAlYb* (AA_Y) quasicrystals, more attention has been reserved to this material. Moreover, recently, also superconductivity has been observed in *AuGeYb* (AG_Y) approximant crystal (AC), which have periodic structures whose unit cell has atomic decorations similar to those of the QC and whose composition is close to that of the QC. The AG_Y approximant presents Tsai-Type structures, the same presented by the AA_Y approximants. Thereby, these two materials are structurally very similar and present very interesting properties, which deserve to be investigated in more detail. Following this, this research reports the growth process of the AA_Y QC and AC, as well as that for the AG_Y AC. The phase was identified by X-Ray Diffraction (XRD) and the samples were analyzed by means of their phase transition using the Differential Scanning Calorimetry (DSC) technique. In addition, the stoichiometry was obtained by Scanning Electron Microscope (SEM) and their magnetic properties were also studied using a SQUID magnetometer. R.A.R. was supported by the Gordon and Betty Moore Foundation EPiQS Initiative (Grant No. GBMF4411) and by FAPESP (2011/19924-2) and CNPq.