

Quasicrystalline phase in Al-Mn-Fe-X melt spun ribbons – structure and stability

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Aluminium alloys strengthened with quasicrystalline particles exhibit interesting mechanical properties, especially high strength. Structure responsible for these properties consisting of small quasicrystalline particles embedded in an aluminium matrix can be formed in various processes including rapid quenching.

In this work, alloys with nominal compositions $\text{Al}_{91}\text{Mn}_6\text{Fe}_2\text{X}_1$ ($\text{X}=\text{Cr, V, Ti, Mo, W}$) were prepared by the melt-spinning method. The aim of the study was to investigate the effects of subsequent alloying elements on the structure, morphology, and stability of quasicrystalline phase present in the samples.

Obtained results indicated that small addition of transition metals (1 at.%) to $\text{Al}_{91}\text{Mn}_7\text{Fe}_2$ alloy can improve thermal stability of the quasicrystalline phase and increase microhardness of the obtained samples in as spun state by additional matrix strengthening.