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# Ultrasonic properties of $\text{Mg}_{23}\text{Al}_3\text{Y}_4$ alloy with LPSO structures

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## ABSTRACT

Ultrasonic properties of  $\text{Mg}_{23}\text{Al}_3\text{Y}_4$  alloy, which has a synchronized long-period stacking ordered (LPSO) structure, were examined in terms of valence electron concentration (*VEC*), and real and complex elasticities. The alloy locates to a point (2.54, 436.5 K) near a critical amorphous alloy composition, and a point with largest Poisson's ratio (0.322) and lower  $G/K$  (0.404) in metal group, showing a metastable like metallic alloy. The addition of small amounts of Al and Y elements, *i.e.* appearance of excess electrons induces an increase in  $c/a$  ratio and cell expansion of hcp Mg lattice, and stabilization of cluster structures, leading to formation of LPSO phases with  $\text{L1}_2$  typed  $\text{Al}_6\text{Y}_8$  clusters. The elasticity and viscoelasticity of the alloy is predominated by

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