

Influence of Sc on microstructure and mechanical properties of Al-Li-based alloys

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Al-Li-based alloys of the third generation are often used in the aerospace industry due to their low density [1]. They contain several alloying elements, such as Mg, Cu, Ag, Zn, Mn and Zr. An addition of Sc yields new opportunities to the material exploitation since it enriches precipitation of the former recrystallization hindering Al_3Zr phase by a formation of dense dispersion of Al_3Sc serving as its nucleation sites.

Two alloys with a composition similar to AA2195 alloy with and without Sc addition were studied. The effect of Sc could be noticed not only in materials after appropriate thermomechanical treatment but already in as-cast ones. The alloy with the Sc content evinced a visible grain refinement. Sc addition also manifested itself in microhardness of the alloys, as the higher values were always reached in the case of the alloy with Sc.

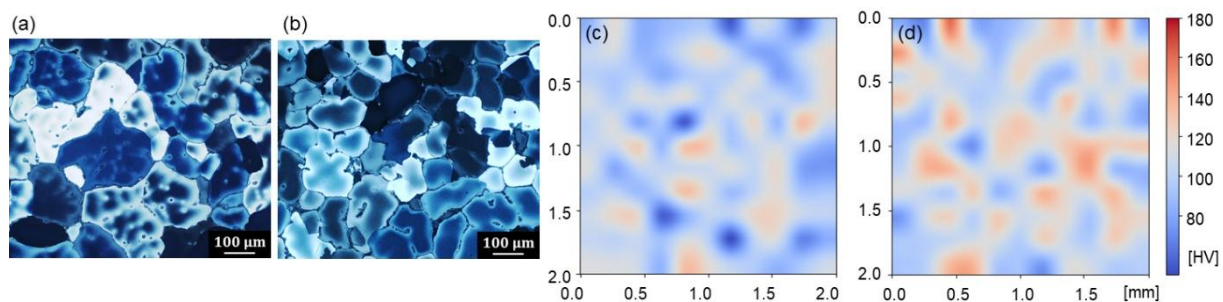


Fig. 1 Grain structure of (a) Sc-free, (b) Sc-containing alloy in the as-cast state. Distribution of microhardness in the central part of (c) Sc-free and (d) Sc-containing ingots.

Keywords: Al-Li alloy, $\text{Al}_3(\text{Sc,Zr})$ particles, microstructure, microhardness

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References

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