

## Extra-Strengthening of Ultrafine-Grained A2024 Alloy Produced by High-Pressure Sliding and subsequent aging treatment

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In this study, the method of high-pressure sliding (HPS) upsized recently [1] was applied for grain refinement of an A2024 alloy [2]. Sheet samples with 10-15mm width and 100mm length with 1mm thickness were processed by HPS under pressures of 2-3 GPa. Microstructural observations revealed that fine grain structure having high-angles misorientation was well developed homogeneously after 20mm HPS processing, leading to an average grain size of ~200 nm. Vickers microhardness was increased up to 255 Hv. Tensile tests showed that the ultimate tensile strength reached 886 MPa with a total elongation of 7.1% and the anisotropy of samples was less developed in the HPS-processed samples. By conducting the post-HPS aging, an ultimate tensile strength was increased up to 966 MPa and 967 MPa at the peak aged condition at 373 K and 423 K respectively. It should be noted that grain size at the peak aging shows no significant grain growth and remains submicrometer range. The main precipitate formed at the peak aged condition was identified as Al<sub>2</sub>Cu after aging at 373 K and Al<sub>2</sub>CuMg after aging at 423 K.

[1] Y. Takizawa, T. Masuda, K. Fujimitsu, T. Kajita, K. Watanabe, M. Yumoto, Y. Otagiri, Z. Horita, *Metall. Mater. Trans.A.* **47**, (2016) 4669.

[2] T. Masuda, Y. Takizawa, M. Yumoto, Y. Otagiri, Z. Horita, *J. Japan Inst. Mater.* **80** (2016) 593.