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PALS of Hot-Rolled and Subsequently T4-Treated AlCu4Mg0.3Ag0.7

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Positron Annihilation Lifetime Spectroscopy (PALS) is a unique tool for studying precipitation hardening in Al alloys, utilizing the tendency of positrons to get trapped in Cu clusters/precipitates.

Alloying AlCu with Ag has been shown to leverage the formation of the so-called Ω -phase, known for its particularly high strength and thermal stability.

After discussing optimal Al-alloy surface treatments for positron annihilation spectroscopy, we present PALS measurements of AlCu4Mg0.3Ag0.7 containing Ω -phase precipitation after hot-rolling and subsequent T4-treatment.

Our measurements showcase the high thermal stability of the Ω -phase and can be used to optimize process parameters of the strength hardening and the temperature treatment.

All data presented have been recorded at the SLOPE facility at TUM [1] and the ELBE facility at HZDR [2].

[1] L. Mathes, M. Suhr, V. V. Burwitz, D. R. Russell, S. Vohburger, and C. Hugenschmidt, "Surface and near-surface positron annihilation spectroscopy at very low positron energy," arXiv preprint, arXiv:2409.07952, Sep. 2024.

[2] A. Wagner, M. Butterling, M.O. Liedke, K. Protzger, R. Krause-Rehberg, "Positron annihilation lifetime and Doppler broadening spectroscopy at the ELBE facility," AIP Conference Proceedings 1970, 2018.

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