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Investigating the effect of hot forming cold die quenching (HFQ) for equal channel angular pressing (ECAP) of AA2024 aluminum alloy

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Abstract: The influence of hot forming cold die quenching (HFQ) in equal channel angular pressing (ECAP) of AA2024
aluminium alloy is investigated and the variation in mechanical, physical and microstructural properties is studied. Samples are compared in two cooling conditions including water quenched (WQ) and cold die quenched (CDQ)-ECAPed process. To investigate the effect of aging process, mechanical properties and microstructural observations of the samples are studied in as-deformed and aged conditions. Further increase in hardness is observed when the samples aged. It seems HFQ-ECAPed process due to the High strengthening effect, reduced pressing load and effective cooling rate which causes a good precipitation hardening effect, is the replacing solution to WQ-ECAP of AA2024 alloy.

Keywords: Equal channel angular pressing (ECAP); Hot forming cold die quenching (HFQ); AA2024; Microstructure; Aging.