IMPROVING OXIDATION BEHAVIOR OF (ALPHA- BETA)
(CU-ZN40) BRASS BY ALUMINUM ADDITION

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ABSTRACT
Brass alloys with a zinc content of 35 % and more have a mixture of the alpha (FCC) and beta (BCC) phases, that causes an increasing in hardness significantly. Further, this alloy can be formed only by hot-working. Therefore, it appears problematic of oxidation at high temperature. This leads to create an idea of improving oxidation behavior of the $\alpha+\beta$ (Cu-Zn40) brass alloy by adding different amounts of aluminum(1, 3 and 5) wt %. Cyclic oxidation tests were conducted on the $\alpha+\beta$ (Cu-Zn40) brass with and without aluminum in the air at temperatures range between 500-700°C for 18 hours at 6 hours cycle. All specimens exhibited parabolic oxidation rate dependence and the value of $K_p$ for ($\alpha+\beta$) (Cu-Zn40) brass alloy with aluminum is nearly lower than that for($\alpha+\beta$) (Cu-Zn40) brass alloy under the same condition. The phases appear in the cyclic oxidation of $\alpha+\beta$ (Cu-Zn40) brass surface after addition of aluminum under further most test situations as exposed by XRD examination are (Al$_2$O$_3$, ZnO, CuO).

KEYWORDS: Brass Alloys, Brass Oxidation, High Temperature Oxidation, Copper Base Alloys, Brass (Cu-Zn40)