Pengaruh penambahan unsur paduan tembaga terhadap ketahanan korosi dan struktur kristal pada paduan Al-8Si dalam cairan pendingin = The influence of addition copper alloy element on corrosion resistance and crystal structure of Al-8Si alloys in coolant water.

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Abstrak

Penilitian Paduan Al-8Si dengan variasi penambahan Tembaga menganalisa ketahanan korosi dan struktur kristal dalam cairan pendingin. Paduan ini secara luas digunakan sebagai aplikasi dalam bidang industri otomotif. Karakterisasi difraksi X-Ray dan uji elektrokimia untuk menyelidiki struktur kristal dan laju korosi dari paduan. Hasil pola difraksi diperoleh fasa-fasa intermetalik dan pergeseran puncak ketika kandungan tembaga bertambah. Hasil perhitungan ukuran kritsal pada paduan Al-8Si-xCu (x= 0, 2, 5, 9 wt%) dengan metode Williamson-Hall. Ukuran Kristal terbesar didapatkan pada sampel Al-8Si-0Cu sebesar 104 nm, ketika kandungan tembaga ditambahkan maka ukuran Kristal akan menurun. Hasil pengujian korosi divalidasi dengan potensiodinamik, sampel menunjukan laju korosi yang berbeda. Ketahanan korosi dari paduan Al-8Si-0Cu lebih baik dibandingkan paduan Al-8Si-xCu (x= 2, 5, 9 wt%) lainnya dengan laju korosi 3,314x10⁻² mm/tahun. Kesimpulannya, penambahan tembaga mempengaruhi penurunan ketahanan korosi dan memunculkan fasa-fasa intermetalik.
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Aluminium alloys can improve mechanical properties, but it can influence corrosion rate of the alloys. Characterization of X-Ray diffraction and electrochemical investigate crystal structure and corrosion rate of these alloys. From the XRD pattern, Al-Cu-Mg, Al, Al-Fe phases were identified and some peaks were shifted due to Copper content increment. The result of crystallite size of Al-8Si-xCu (x= 0, 2, 5, 9) alloys were measured by Williamson-Hall method. The largest of crystallite size was obtained in Al-8Si-0Cu of 104 nm. Further addition of Copper content, the crystallite sizes are lowest among the investigated alloys. Electrochemical tests were validated that these alloys show different corrosion rate. In the Al-8Si-0Cu, corrosion rate is 3,314x10⁻² mm/year, which is slowest rate among the investigated alloys. On conclusion, the additional of Copper content affects decrement of corrosion resistance and giving rise of intermetallic phases.