

## Analisis sifat korosi daerah pengelasan pada AA 5083 dengan proses friction stir welding di lingkungan netral, asam, dan basa = Analysis of corrosion behavior of weld zone in AA 5083 with friction stir welding process in neutral, acidic, and basic environments

Muhammad Hilmi Hakim, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20518940&lokasi=lokal>

---

### Abstrak

Aluminium merupakan salah satu komoditas utama di berbagai industri karena sifatnya yang tahan karat. Namun, lapisan oksida  $Al_2O_3$  yang timbul pada permukaan aluminium menjadikan aluminium rentan terkena deformasi saat proses pengelasan. Friction stir welding (FSW) merupakan salah satu metode pengelasan yang mampu menjadikan proses pengelasan aluminium menjadi lebih kuat karena mikrostruktur hasil proses pengelasannya yang lebih halus, sehingga laju korosi produk pengelasan juga dapat menurun. Karakteristik laju korosi sampel FSW di observasi pada lingkungan netral (3.5 wt% NaCl), asam (0.5 M  $H_2SO_4$ ), dan basa (0.5 M NaOH) dengan metode linear sweep voltammetry (LSV) untuk menganalisis pengaruh proses FSW terhadap sifat korosi pada lingkungan yang berbeda, karakterisasi XRD digunakan untuk menganalisis parameter kristal sampel Base metal (BM) dan FSW. Hasil pengujian korosi menunjukkan peningkatan laju korosi pada lingkungan netral, asam, dan basa secara berturut-turut sebesar -20,75%; 10,54%; dan 4,83%. Kemudian berdasarkan hasil difraksi sinar X menggunakan metode W-H plot diketahui terjadi proses pembesaran parameter ukuran rata-rata kristal dari 437,394  $\text{\AA}$  menjadi 650,957  $\text{\AA}$  pada sampel FSW. Tingginya nilai microstrain dan pergeseran dan pelebaran puncak difraksi menjadi indikasi terdapat tegangan sisa pada sampel FSW hasil dari proses pengelasan yang mengurangi sifat ketahanan korosi sampel FSW..... Aluminum is one of the main commodities in various industries because of its corrosion resistance. However, the  $Al_2O_3$  oxide layers that appears on the aluminum surface makes aluminum susceptible to deformation during the welding process. Friction stir welding (FSW) is a welding method that can make the product of welded aluminum stronger because the microstructure of the welding products is smoother, so that the corrosion rate of welding products can also decrease. The characteristics of the corrosion rate of FSW samples were observed in neutral (3.5 wt% NaCl), acidic (0.5 M  $H_2SO_4$ ), and alkaline (0.5 M NaOH) environments using the linear sweep voltammetry (LSV) method to analyze the effect of the FSW process on corrosion properties in the different environment, XRD characterization was used to analyze the crystal parameters of the Base metal (BM) and FSW samples. The results of the corrosion test showed an increase in the corrosion rate in neutral, acidic, and alkaline environments, respectively, by 10.54%; -20.75%; and 4.83%. Then based on the results of X-ray diffraction using the W-H plot method, it is known that there is a process of enlargement of the average crystal size parameter from 437,394 to 650,957 in the FSW sample. The high value of microstrain and the shift and broadening of the diffraction peaks are an indication that there is residual stress in the FSW sample resulting from the welding process which reduces the corrosion resistance properties of the FSW sample.