

عنوان مقاله:

Corrosion Polarization Behavior of Al-SiO₂ Composites in 1M and Related Microstructural Analysis

محل انتشار:

ماهنامه بین المللی مهندسی، دوره 32، شماره 7 (سال: 1398)

تعداد صفحات اصل مقاله: 9

نویسندگان:

N. Munasir - *Department of Physics, Faculty of Mathematics and Sciences, Universitas Negeri Surabaya, Jl. Ketintang Surabaya, Indonesia*

T. Triwikantoro - *Department of Physics, Faculty of Sciences, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia*

M. Zainuri - *Department of Physics, Faculty of Sciences, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia*

R. Bäßler - *BAM-Federal Institute for Materials Research and Testing, Division ۶.۲: Corrosion Protection of Technical Plants and Equipment, Unter den Eichen, Berlin, Germany*

خلاصه مقاله:

The composites combining aluminum and silica nanoparticles with the addition of tetramethylammonium hydroxide (Al-SiO₂(T)) and butanol (Al-SiO₂(B)) as mixing media have been successfully fabricated. Corrosion behavior of Al-SiO₂ composites before and after exposure in 1M NaCl solution was examined using potentiodynamic polarization (Tafel curve analysis). The study was also equipped with scanning electron microscopy (SEM), energy dispersive X-ray (EDX), and X-ray diffraction (XRD) investigations. Before exposure, Al-SiO₂(T) exhibited the best corrosion resistance. Performance improvement was indicated by Al-SiO₂(B) up to 10 times better than Al-SiO₂(T) after exposure. The increased SiO₂ content did not significantly enhance the corrosion resistance of the composites. The Al-SiO₂ composites with 5% SiO₂ content showed very high corrosion resistance (as the optimum composition). Furthermore, pitting corrosion was observed in the Al-SiO₂ composites, indicated by the formation of corrosion products at grain boundaries. The product was affected by the presence of SiO₂ in the Al matrix and the NaCl environment at 90°C (approach to synthetic geothermal media: Na⁺, Cl⁻, H⁺, OH⁻). Our study revealed the presence of .g-Al₂O₃, g-Al(OH)₃, and Al(OH)₂Cl as the dominant corrosion products

کلمات کلیدی:

Al-Composite, corrosion, corrosion rate, SiO₂ Nanoparticle, Tafel Plot

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/962788>



