Sifat-sifat lapisan tipis alumina yang dibuat melalui proses sol-gel dengan prekursor organik

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Abstrak

ABSTRAK
Penelitian ini bertujuan untuk mempelajari sifat-sifat dari lapisan tipis alumina. Sol alumina berbasis air yang diturunkan dari prekursor organik aluminium secondary butoxide (ASB) dibuat melalui proses Yoldas. Pengaruh derajat hidrolisis dan keasaman dipelajari dengan XRD dan FT-Raman spectrometer. Selanjutnya boehmit yang terbentuk dipanaskan dan dikarakterisasi seperti sebelumnya. Untuk mempelajari sifat-sifat lapisan boehmit dideposisikan pada berbagai subtrat (gelas, Al, Cu, dan Stainless steel). Morfologi dari film diamati dengan mikroskop optik dan SEM. Ketebalan dari film ditentukan dengan metode indentasi dengan UMIS-2000 menggunakan indenter sferis 1 µm. ketebalan film tergantung dari gaya adhesi antar sol dan subtrat. Ketebalan film pada 5 x pelapisan untuk subtrat SS antara 60 nm sampai dengan 120 nm. Modulus dan kekerasan dpelajari dengan indenter sferis 10 µm dan biaxial bending. Hasil dari penelitian ini disajikan dalam Bab 6.
<hr>ABSTRACT
The aim of this project is to investigate the properties of sol-gel deposited alumina films. The water base alumina sol was derived from alumina secondary butoxide through Yoldas process. The effect of hydrolysis and acidity were studied using XRD and FT-Raman spectrometer in order to characterize the structure of boehmite. Furthermore, produced boehmite were fired and characterized as previous methods. For studying the film properties, the boehmite was deposited onto substrates (glass, Al, Cu and stainless steel). The surface properties were observed using an optic microscope and SEM. The thickness of the film was determined through indentation method using UMIS-2000 with 1 µm spherical tipped indenter. The thickness of the film depends on the adhesion force between boehmite sol and substrate. The film thickness of stainless steel-coated alumina was found between 60 nm to 120 nm. The elastic modulus and hardness of the film were investigated using 10 µm spherical indenter and biaxial bending test. The result of this project is presented in Chapter 6.