

Pengaruh Bovine Serum Albumin terhadap Perilaku Korosi Niobium dalam Larutan Phosphate Buffered Saline = Effect of Bovine Serum Albumin on Corrosion Behavior of Niobium in Phosphate Buffered Saline Solution

Rizky Alfiansyah, author

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Abstrak

Dalam tubuh manusia, bahan implan tidak hanya berinteraksi dengan ion anorganik, tetapi juga berinteraksi dengan senyawa organik, terutama protein. Variasi konsentrasi 0 g/L – 0,4 g/L Bovine Serum Albumin (BSA) sebagai protein yang disimulasikan ditambahkan pada larutan Phosphate Buffered Saline (PBS) untuk mengamati perilaku korosi niobium (Nb) melalui pengujian elektrokimia dan karakterisasi permukaan. Berdasarkan analisis kurva polarisasi potensiodinamik, didapatkan nilai potensial korosi yaitu -0,84 V; -0,86 V; -0,87 V; -0,87 V dan rapat arus korosi 4,4 A cm⁻²; 2,9 A cm⁻²; 1,9 A cm⁻²; 1,9 A cm⁻². Nilai potensial dan rapat arus korosi menurun seiring penambahan konsentrasi BSA, menyebabkan laju korosi yang menurun juga. Analisis hasil karakterisasi XRD menunjukkan bahwa fasa oksida dari Nb tidak muncul, karena lapisan oksida yang terbentuk sangat tipis. Pengamatan morfologi permukaan menggunakan Scanning Electron Microscope (SEM) juga didapatkan jumlah kerusakan akibat serangan korosi semakin berkurang seiring penambahan konsentrasi BSA.

.....In the human body, the material of the implant is not only interact with the inorganic ions, but also interact with organic compounds, especially proteins. Variation of the concentration of 0 g/L to 0.4 g/L Bovine Serum Albumin (BSA) as a protein that is simulated is added in a solution of Phosphate Buffered Saline (PBS) to observe the corrosion behavior of niobium (Nb), through testing and electrochemical characterization of the surface. Based on the analysis of the curves of potentiodynamic polarization, obtained the value of the corrosion potential that is -0.84 V; -0.86 V; -0.87 V; -0.87 V and current density of corrosion of 4.4 $\mu\text{A cm}^{-2}$; a 2.9 $\mu\text{A cm}^{-2}$; the 1.9 $\mu\text{A cm}^{-2}$; A 1.9 $\mu\text{A cm}^{-2}$. The value of the potential and current density of corrosion decreases as the addition of the concentration of BSA, causing the corrosion rate decreased as well. Analysis of the results of XRD characterization shows that the phase of the oxide of Nb does not appear, because the oxide layer formed is very thin. The observation of surface morphology using Scanning Electron Microscope (SEM) also showed the amount of damage due to corrosion attack on the wane as the addition of the concentration of BSA.