Pengaruh Komposisi Bak Koagulasi Dalam Pembentukan Membran Elektrolit Padat Berbasis Selulosa Asetat Melalui Proses NIPS Terhadap Morfologi Dan Performa Elektrokimia Membran = Effect Of Coagulation Bath Composition In The Formation Of Cellulose Acetate-Based Solid Electrolyte Membrane Through The NIPS Process On The Morphology And Electrochemical Performance Of The Membrane

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Abstrak

Membran elektrolit padat berbahan selulosa asetat memiliki proses fabrikasi yang lebih ramah lingkungan dan dapat terdegradasi secara alami. Fokus dalam penelitian ini adalah proses fabrikasi separator baterai padat berbasis selulosa melalui metode pemisahan fase terinduksi nonsolvent (NIPS) dengan pelarut aseton dan non-pelarut air. Dalam penilitian ini akan diselidiki pengaruh variasi komposisi aseton dalam bak koagulasi, mulai dari 0%, 25%, 50% hingga 75%(v/v) terhadap morfologi serta performa membran. Pengujian yang dilakukan berupa uji tarik, porositas, rasio penyusutan, penyerapan elektrolit, sudut kontak, Electrochemical Impedance Spectroscopy (EIS), Fourier Transform Infrared Spectroscopy (FTIR), dan Scanning Electron Microscopy (SEM) dan menghasilkan kesimpulan bahwa peningkatan komposisi asetan dalam bak koagulasi meningkatkan terjadinya proses pemisahan, yang memicu peningkatan porositas, penyerapan elektrolit, hidrofisilitas, kemampuan pembasahan, dan konduktivitas ionik, namun menurunkan kekuatan tarik. Perubahan struktur yang terjadi akibat perubahan komposisi aseton dalam bak koagulasi dibuktikan dengan perubahan morfologi membrane melalui Scanning Electron Microscopy (SEM).
.....Solid electrolyte membranes made from cellulose acetate have a fabrication process that is more environmentally friendly and can be degraded naturally. The focus of this research is the fabrication process of cellulose-based solid battery separators through the nonsolvent induced phase separation (NIPS) method with acetone as solvent and water as non-solvent. This research will show the effect of variations in the composition of acetone in the coagulation bath, ranging from 0%, 25%, 50% to 75% (v/v) on the morphology and performance of the membrane. The tests carried out were tensile test, porosity, shrinkage ratio, electrolyte uptake, contact angle, Electrochemical Impedance Spectroscopy (EIS), Fourier Transform Infrared Spectroscopy (FTIR), and Scanning Electron Microscopy (SEM) and resulted in the conclusion that the composition of the increased acetate in the coagulation bath enhances the demixing process, which increases porosity, electrolyte absorption, hydrophilicity, wetting ability, and ionic conductivity, but decreases tensile strength. Structural changes that occur due to changes in the composition of acetone in the coagulation bath are evidenced by changes in membrane morphology through Scanning Electron Microscopy (SEM).