

Pengaruh Penambahan Iodine Terhadap Perilaku Elektro-kimia Pada Proses Ekstraksi Limbah Printed Circuit Board (PCB) Melalui Metode Cyclic Voltammetry dengan Media Pelarut Deep Eutectic Solvent (DES) Ethaline. = Effect of Iodine Addition on Electro-chemical Behavior in Printed Circuit Board (PCB) Waste Extraction process Through Cyclic Voltammetry Method with Deep Eutectic Solvent (DES) Ethaline Solvent Media.

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Abstrak

Pesatnya perkembangan teknologi dapat meningkatkan kebutuhan akan logam, namun ketersediaan sumber daya primer mineral logam akan semakin menipis sehingga diperlukan sumber daya sekunder atau alternatif seperti Printed Circuit Board (PCB) yang memiliki kandungan logam tembaga, besi, dan timah dengan konsentrasi yang tinggi. Proses ekstraksi limbah elektronik haruslah ramah lingkungan, sehingga pada penelitian kali ini akan menggunakan proses hidrometalurgi dengan pelarut organik yaitu Deep Eutectic Solvent (DES) Ethaline. Penelitian ini bertujuan untuk mengetahui perilaku elektro-kimia dari Printed Circuit Board (PCB) dengan sampel kontrol berupa Printed Circuit Board (PCB) sintetis, pengaruh variasi temperatur, dan penambahan iodine terhadap perilaku elektro-kimia dari Printed Circuit Board (PCB) serta Printed Circuit Board (PCB) sintetis. Pada Cyclic Voltammogram dari sampel Printed Circuit Board (PCB) dan Printed Circuit Board (PCB) sintetis terdapat E_p pada potensial $-0,4$ V yang merupakan nilai potensial untuk reaksi anodik dengan reaksi oksidasi Cu^+/Cu^{2+} . Pada temperatur yang lebih tinggi nilai E_p akan semakin kecil dan nilai peak current (i_p) akan semakin tinggi karena transfer elektron yang semakin cepat. Penambahan iodine pada sampel mengakibatkan lebih banyak reaksi redoks yang terjadi sehingga terlihat potential peak untuk reaksi anoda dan katoda. Dengan mengetahui perilaku elektro-kimia dari Printed Circuit Board (PCB) didapatkan nilai potensial dan parameter optimal untuk proses elektrodposisi logam tembaga, besi, dan timah.

.....The rapid development of technology can increase the need for metal, but the availability of primary metal mineral resources will be depleting so that secondary or alternative resources are needed such as Printed Circuit Board (PCB) which contain copper, iron, and tin with high concentration. The electronic waste extraction process must be environmentally friendly, so in this study we will use a hydrometallurgical process with an organic solvent, namely Deep Eutectic Solvent (DES) Ethaline. This study aims to determine the electrochemical behavior of the Printed Circuit Board (PCB) with a control sample in the form of a synthetic Printed Circuit Board (PCB), the effect of temperature variations, and the addition of iodine to the electrochemical behavior of the Printed Circuit Board (PCB) and the synthetic Printed Circuit Board (PCB). In the Cyclic Voltammogram of the synthetic Printed Circuit Board (PCB) and Printed Circuit Board (PCB) samples, there is E_p at a potential of -0.4 V which is the potential value for the anodic reaction with the Cu^+/Cu^{2+} oxidation reaction. At higher temperatures, the value of E_p will be smaller, and the value of peak current (i_p) will be higher because of the faster electron transfer. The addition of iodine to the sample resulted in more redox reactions that occurred so that potential peaks was seen for the anode and cathode reactions. By knowing the electrochemical behavior of the Printed Circuit Board (PCB), the

potential values and optimal parameters for the electrodeposition process of copper, iron, and tin metals are obtained.