INTISARI

STUDI PEMBUATAN ALAT UKUR KONSENTRASI LOGAM DI DALAM PASIR BESERTA KARAKTERISASINYA, BERBASIS INDUKSI DIRI

Oleh

Sabrina Artvista Hartanto

21/473856/PA/20434

Telah dilakukan penelitian tentang studi pembuatan alat ukur konsentrasi besi di dalam pasir besi secara elektronis berbasis induksi diri. Hal itu dilatarbelakangi oleh perlunya informasi keekonomian untuk menambang pasir besi secara praktis dan efisien. Tujuan dari penelitian ini adalah untuk merancang dan membuat alat ukur konsentrasi logam di dalam pasir berbasis induksi diri, serta dilakukan karakterisasinya. Manfaat penelitian ini, untuk meningkatkan kecepatan dalam perolehan konsentrasi besi di dalam pasir besi, dan kemudahan penggunaannya sehingga berdampak besar pada industri penambangan pasir besi. Metode penelitian ini terbagi menjadi 3 tahap, yaitu desain dan pembuatan alat, eksperimen pendahuluan, dan pengambilan data. Desain dan pembuatan alat induksi diri melibatkan pembuatan koil dengan lilitan primer dan lilitan sekunder. Uji pendahuluan dilakukan dengan mengambil 200 mL pasir besi dan mengukur tegangan keluaran (V_s) pada koil sekunder oleh variasi lilitan. Pengambilan data dilakukan untuk setiap konsentrasi pasir besi (K) dengan sembilan variasi konsentrasi. Langkah-langkah spesifik mencakup pengambilan pasir, pengukuran massa total dan massa besi, serta penggunaan magnet permanen untuk menentukan konsentrasi besi di dalam pasir besi. Hasil dari penelitian ini, diperoleh prototipe alat ukur konsentrasi logam yang berbasis elektronis pada koil sekunder (1.000 lilitan), volume pasir 200 mL sehingga dapat diplot V_s (volt) vs K (%), pada 2 kawasan ukur konsentrasi (0 – 70%) berupa V_{s1} = 0,5K + 2,5 dan konsentrasi (70 - 100%) berupa V_{s2} = 1,4K – 68,6.

Kata kunci: alat ukur konsentrasi logam, induksi diri, karakterisasi

ABSTRACT

THE STUDY FOR DEVELOPMENT OF A METAL CONCENTRATION AND CHARACTERISTIC MEASUREMENT TOOL IN SAND BASED ON SELF-INDUCTION

by

Sabrina Artvista Hartanto

21/473856/PA/20434

Research has been conducted on the study for development of iron concentration measurement tool in iron sand electronically based on self-induction. This research was motivated by the need for economic feasibility information to mine iron sand practically and efficiently. The objective of this study was to design and develop a device for measuring metal concentration in sand using self-induction and to perform its characterization. The benefits of this research include increasing the speed of obtaining iron concentration in iron sand and ease of use, which has a significant impact on the iron sand mining industry. The research method was divided into three stages: device design and fabrication, preliminary experiments, and data collection. The design and fabrication of the self-induction device involved creating a coil with primary and secondary windings. Preliminary testing was conducted by taking 200 mL of iron sand and measuring the output voltage (V_s) at the secondary coil for variations in the number of windings. Data collection was performed for each iron sand concentration (K) with nine variations of concentration. Specific steps included collecting sand, measuring the total mass and iron mass, and using a permanent magnet to determine the iron concentration in the sand. The results of this study produced a prototype of an electronic device for measuring metal concentration using a secondary coil (1,000 windings) with a sand volume of 200 mL. The data were plotted as V_s (volts) versus K (%) in two measurement ranges: (0 – 70%) with V_{s1} = 0,5K + 2,5 and (70 - 100%) with V_{s2} = 1,4K – 68,6.

Keywords: metal concentration measuring instrument, self-induction, characterization