

APLIKASI HIDROKSIDA LOGAM KADMIUM (II) HASIL ELEKTROKOAGULASI LIMBAH CAIR ELEKTROPLATING UNTUK PEWARNA GELASIR KERAMIK

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh suhu pembakaran dan massa hidroksida logam hasil elektrokoagulasi limbah cair elektroplating, terhadap warna gelasir keramik.

Subjek penelitian ini adalah hidroksida logam kadmium (II) hasil elektrokoagulasi limbah cair elektroplating dari sentra kerajinan perak di Kotagede Yogyakarta. Objek penelitian ini adalah warna gelasir keramik dengan bahan pewarna hidroksida logam kadmium (II) hasil elektrokoagulasi limbah cair elektroplating. Penelitian dilakukan dengan karakterisasi limbah cair elektroplating Balai Laboratorium Kesehatan Yogyakarta. Limbah cair elektroplating dielektrokoagulasi pada pH 8, rapat arus $0,00125 \text{ A/cm}^2$, elektroda Al-Al, volume 500 mL, dan waktu selama 30 menit. Hasil elektrokoagulasi dikeringkan dan dikarakterisasi di Pusat Sains dan Teknologi Akselarator-BATAN. Hidroksida yang dihasilkan diaplikasikan sebagai bahan pewarna gelasir keramik. Pengaruh suhu pembakaran keramik dipelajari dengan variasi suhu 999, 1060, dan 1101°C . Pengaruh massa hidroksida logam Cd dipelajari dengan variasi 4, 12, dan 16%.

Hasil penelitian menunjukkan bahwa kadar logam cadmium dalam limbah cair elektroplating sebesar 0,0890 mg/L, sedangkan kadar logam Cd dalam hidroksida logam hasil elektrokoagulasi adalah kurang dari 0,001%. Suhu pembakaran dan massa hidroksida logam mempengaruhi warna gelasir keramik. Semakin besar suhu pembakaran dan massa hidroksida logam, semakin kecil nilai L^* , semakin besar nilai a^* dan b^* , warna yang dihasilkan semakin gelap. Nilai L^* menyatakan tingkat kecerahan, nilai a^* menyatakan warna hijau-merah, dan nilai b^* menyatakan warna biru-kuning.

Kata kunci: hidroksidalogam, elektrokoagulasi, suhu, massa, gelasirkeramik.

APPLICATION OF CADMIUM (II) METAL HYDROXIDE AS RESULT OF ELEKTROCOAGULATION OF ELECTROPLATING LIQUID WASTE FOR CERAMIC GLAZE DYE

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ABSTRACT

This study aims to determine the effect of combustion temperature and mass of metal hydroxide electrocoagulation result of electroplating liquid waste to color of ceramic glaze.

The subject of this research is cadmium (II) metal hydroxide electrocoagulation as result of electroplating liquid waste from silver handicraft center in Kotagede Yogyakarta. The object of this research is the color of ceramic glaze with cadmium metal hydroxide (II) dye electrocoagulation result of electroplating liquid waste. The research was conducted with characterization of electroplating liquid waste of Health Laboratory Yogyakarta. The electroplating liquid wastewater is electrocoagulated at pH 8, current density 0.00125 A/cm^2 , Al-Al electrode, volume 500 mL, and time for 30 minutes. The electrocoagulation results are dried and characterized at the BATAN-Accelerator Science and Technology Center. The resulting hydroxide was applied as a ceramic glaze dye. The effect of ceramic combustion temperature was studied with temperature variations of 999, 1060, and 1101 °C. The effect of mass was studied with variation of 4, 12, and 16%.

The results showed that the content of cadmium metal in the electroplating liquid waste was 0.0890 mg/L, while in the metal hydroxide the electrocoagulation result of Cd metal content was less than 0.01%. The combustion temperature and the metal hydroxide mass affect the color of the ceramic glaze. The great increasing of burning temperature and hydroxide Cd mass, the small decreasing of the L^* value, the great increasing of the a^* and b^* values, and the resulting darker color. The L^* value represents lightness, a^* value represents the green-red color, and b^* value represents the blue-yellow color.

Keywords: cadmium metal hydroxide, electrocoagulation, temperature, mass, ceramic tile.