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“CLEANER PRODUCTION TOWARDS A SUSTAINABLE TRANSITION”

## Assessment of the Viability of Production of Ceramic Tiles from Waste Generated in the Casting Process Using Plasma Electrolytic Oxide of Aluminum Alloy

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### Abstract

The casting process is the production of metal parts when a metal or molten metal alloy is placed on a hollow mold made of sand. During fabrication of sand molds is generated as a byproduct dust exhaust. Disposal of this waste has several environmental damage as a modification of the natural landscape and occupation of large areas with landfilling, beyond this material is potentially toxic if disposed in uncontrolled areas. In order to use this waste, this work proposes the use of this waste for the production and characterization of coatings, such as protection film on an aluminum alloy surface plasma electrolytic oxide (PEO). The PEO is a process where the atmospheric plasma and conventional electrolysis are combined for the change of metal surfaces in ceramic oxides. In this work, the coatings were obtained in aluminum alloys by means of plasma electrolytic, electrolyte solution prepared using an exhaust dust and distilled water in concentrations of 5g / L and 20g / L. The electrolytic plasma was obtained by applying a potential difference of 650V, 300Hz frequency, duty cycle of + 60% to -20% and utilizing deposition time of 600s and 1200s. Were asked the exhaust powder analysis and film analysis using Scanning Electron Microscopy (SEM), Energy Dispersive Spectrometry (EDS), X-Ray Diffraction (XRD) and Infrared Spectroscopy (FTIR). The composition of the coatings showed the presence of O, Al, Si, Fe, K, Mg, Na, C, where all concentrations increased with longer deposition. This study also showed that the coatings obtained from concentration of 20g / L and 1200s deposition produce uneven coatings and low adhesion, the condition being discharged for further studies.

**Keywords:** casting residue, ceramic coating, plasma electrolytic oxide, aluminum.