



Sensitive spectrophotometric determination of Zinc in the presence of major interferences in highly complex matrix- electric arc furnace dust

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Electric Arc Furnace Dust (EAFD) is one of the most important by-products in steel-making industry. Over seven million tons toxic dust is produced per year and still more than 50% of the generated dust is lost by sending it to landfill. EAFD contains 5-30 % zinc and is considered as a secondary zinc resource[1-2]. Since the economic feasibility of zinc recovery process is depended to the zinc content, determination of zinc percent in EAFD is very important. On the other hand, dust contains more than 15 elements and tens of chemical complexes that cause problems in zinc determination. The aim of this study is to propose a simple and practical method to determine zinc percent in dust. For this purpose, we used EAFD of Esfarayen Steel Co. as initial zinc source and visible spectrophotometry as the determination method. Zincon (2-carboxy-20-hydroxy-50-sulfoformazylbenzene) was applied as the chromogenic reagent[3]. The best condition for zinc determination obtained at pH=9 using universal buffer. For solving matrix effect and removal of some spectral interferences standard addition method and partial least squares calibration were applied. Results indicate that although Fe^{2+} ions don't react with zincon but seriously interfere in combination of Zn^{2+} ions with zincon. In order to eliminate negative effect of Fe^{2+} , iron oxide precipitation using ammonia solution was used. According to the results, the zinc content of used EAFD was 19.2 % which was consistent with atomic absorption results.

Keywords: Zinc Determination, Electric Arc Furnace Dust, Zincon, Spectrophotometry, Iron Interference

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