

Cr(VI) generation during sample preparation of solid samples – A chromite ore case study

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Abstract

South Africa holds more than 70% of the world's viable chromite ore reserves and produces ~46.2% of the world's high carbon ferrochrome. It was recently reported that beneficiated South African chromite ores contained significant amounts of Cr(VI). If this is true, it could have serious consequences for South African chromite mines and the local environment. Currently none of these mines make any provision for Cr(VI) leaching from their mined ores. The data obtained in this study proved that the Cr(VI) content of chromite samples is influenced by the sample preparation technique employed prior to chemical analysis, more specifically, that pulverising of chromite samples in a normal atmospheric environment resulted in Cr(VI) formation. No Cr(VI) was liberated when pulverising was conducted in an inert atmosphere. The presence of Cr(VI) in South African chromite ores therefore seems unlikely. The results also suggest that the perceived threat of Cr(VI) contamination of groundwater and surface water, originating from chromite ore stockpiles, is improbable.

Keywords: hexavalent chromium, Cr(VI), sample preparation, pulverising, chromite