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Accurate determination of uranium and thorium in Egyptian oil ashes

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Abstract

Uranium and thorium have been measured in oil ash samples collected from four Egyptian power plants that use heavy fuel oil. The U and Th content in oil ashes was determined by INAA, ICP-MS, ICP-OES, WDXRF and EDXRF without any sample pretreatment. Samples were digested using two acid, four acid or fusion method. The concentration of U and Th were found to be within the average worldwide value. Uranium and thorium content in heavy fuel oil were also measured for the first time. For quality control of the analytical data, three internal reference materials were prepared and used.

Keywords

Uranium, Thorium, Fly ash, Heavy fuel oil, ICP, INAA

1. Introduction

Vanadium and nickel have been studied more thoroughly than any other metallic elements found in crude oil. One of the reasons is that these elements are the major metals in crude oil, and occur in part as nitrogen complexes (porphyrins) closely related to chlorophyll and hemoglobin, thus suggesting a biogenic origin for crude oil [1,2]. Many correlations based on vanadium and nickel content have been made in attempts to obtain information on the geological origin of crude oil. In addition, vanadium to nickel

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