

**Title:**

**Research on Release of Trace Elements on Retorting from Huadian Oil Shale**

**Abstract:** (Your abstract must use 10pt Arial font and must not be longer than this box)

Oil shale is quite abundant in the world. Today, the industry of retorting oil shale to produce shale oil is rising in importance due to high world oil prices. In order to study the migratory behavior of trace elements in oil shale on retorting, tests were performed in the laboratory with oil shale from the Huadian deposit of China at different temperatures from 360 to 560°C. The trace elements Ba, Co, Cr, Cu, Mn, Ni, P, Pb, Sr, Ti, V, and Y contained in oil shale and shale char were determined by inductively coupled plasma atomic emission spectroscopy (ICP-AES). Hg and As were determined by atomic fluorescence spectroscopy (AFS). By comparing the contents of trace elements in oil shale and shale char, the distribution characteristics of trace elements on retorting were studied.

The analyses of trace elements indicate that in comparison with the Earth's crustal averages, some elements are enriched in the oil shale samples, including Mn (more than 30 x), P (more than 6 x), and Ti (more than 5 x). The elements Ti, Ba, Co, Cr, Cu, Mn, and V were enriched in shale char on retorting. Pb and Hg started to volatilize at 410°C. Arsenic was enriched about 50% in shale char from 360°C to 560°C. A reducing atmosphere promotes the release of trace elements. The effect of heating rate on different elements was studied in these experiments. For most elements, their release from oil shale can be promoted by a higher heating rate and with a nitrogen atmosphere.

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