

## Trace element contents of Jurassic coals from eastern Taurides, Turkey

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In this study, trace element and organic matter-trace element relation between Jurassic coals exposing in three different fields in the eastern Taurides were examined and their enrichment levels with respect to upper crust values were computed and the coal characteristics were also compared with those from USA and other parts of the world.

In comparison to the Feke and Kızılinç coals, Pb, Zn, Ag and Hg element contents of the Gedikli coals are considerably high; Ni, As and Ge contents are moderately high and Cr, Cu, Co, Cd, Sb, Ga and Sn contents are slightly high. The element concentrations are very similar to those of other fields. In the Gedikli coals, Sr content is extremely low and Ba content is slightly low with respect to other fields. Re, Mo, U, V and B element concentrations are different for each of three fields.

The major element contents of the Feke, Gedikli and Kızılinç coals were correlated with average values of coals from USA and other parts of the world and Fe, K, Mg and Na concentrations were found to be similar. Ti and Al contents of the world and USA coals are higher while Ca and Mn concentrations are lower. Considering trace element contents of the world and USA coals, Ba is considerably high, Cu and Zr are moderately high and Ga, Rb and Sc elements are slightly high. In comparison to world and USA coals, Sr content of the Feke and Kızılinç coals are very high while those of the Gedikli coals are lower.

For major and trace elements, factors of enrichment with respect to upper crust values were also computed. Among the major elements, Ti and K are depleted in the Feke field and Na is depleted in the Kızılinç field while other elements are enriched. The highest enrichment levels were calculated for Ca and Sr. Except for Se and Rb, all other trace elements are enriched with respect to upper crust. Re has the highest enrichment level followed by Ge, B, Sb, Cd, U, As, Te and Mo. Se and Rb show the lowest enrichment level in all the fields and, Th, Ba, Ge, Sc, Cs, Hf, Nb, Zn and Li generally have lower enrichment levels in the studied fields.

## The behaviour of strontium and zinc during ageing of Fe(III) hydroxide

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Oxides and hydroxides of Fe(III) are common components of soil environment and can have a significant role in toxic metal mobility and retention. Sorption of many elements, among them heavy and Earth metals, on Fe hydroxides is fairly well understood. However, little is known about the influence of ageing and transformation of Fe hydroxides on the ions sorbed from solution. The alteration of the ferric hydroxide specific surface area during crystallization and the dynamics of interaction between Zn and Sr with Fe hydroxide were investigated experimentally at 25°C using a combination of potentiometric acid-base titration and metal uptake experiments.

The maximum decrease in Fe hydroxide surface area was observed during first day. Assuming similarity of the acid-base properties of hematite and Fe hydroxide surfaces, the specific surface area of Fe hydroxide was determined as a function of ageing time. The specific surface area determined after one hour, one and ten days following the initial precipitation are 570, 450 and 420 m<sup>2</sup>/g.

We observed a significant difference in the behaviour of strontium and zinc during Fe hydroxide crystallization. Solubility of Sr increases while the hydroxide surface area and consequently, the surface site density, decreases. While increasing ageing time from 2 hours to 10 days, Sr adsorption decreases by ~15%. The fundamental reason leading to reduction of Sr concentration in the solution is the adsorption at the surface of ferric hydroxide. In the case of zinc, even at low pH, sorption on the ferric hydroxide exceeds 40% and increases during mineral crystallization. This demonstrates the predominance of Zn coprecipitation with Fe hydroxide. Such a mechanism effectively decreases mobility because incorporated cations are only remobilized by a change in chemical conditions significant enough to force dissolution of the host mineral.