

Inorganic Arsenic Mobility in Coal Water and Health Human

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Introduction

Arsenic is particularly hazardous because it can be introduced into the environment in several ways, including air-borne emissions from commercial power plants, and oxidation and leaching of arsenic-bearing pyrite, resulting in contamination of surface waters or ground water. The fate of Arsenic during the weathering of As-rich sulfide minerals is ecologically significant for environments especially those related to the production of coal in Santa Catarina¹. Recent contributions to the literature on environmental geochemical have elucidated the influence of systems EhXpH in coal mining and this is the objective this resume with quantification of metal.

Materials and Methods

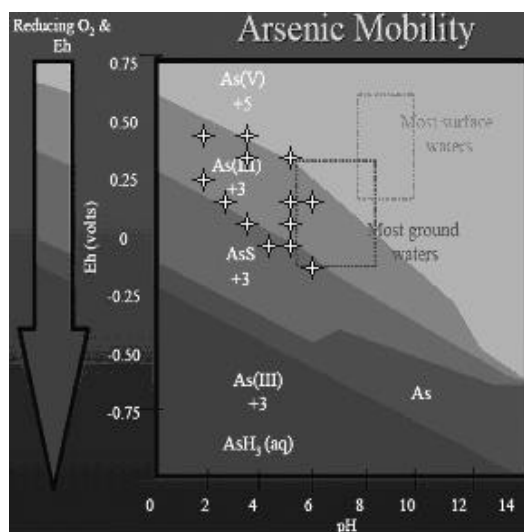
Samples of surface waters were taken at 23 points, comprising spoil heap runoffs and river waters. Briefly, water samples were acidified with nitric acid and treated in closed Teflon containers in a microwave oven to obtained total metal analysis CONAMA (1992) and/or solutions were filtered through a 0.45µm filter Millipore and analyzed for pH; Eh; conductance; sulfates total arsenic (atomic absorption spectroscopy). All the analyses were performed within a period of 72 hr after taking the river water samples. During this time the samples were kept refrigerated at 3°C in completely filled flash to prevent oxidation processes.

Results and Discussion

The maximum value of As detected in acid drainage and contaminated river water is 0,09mgL⁻¹. The average concentration of As in acid drainage of Santa Catarina is 12µg/L.

The health hazards associated with exposure to arsenic are dependent on its oxidation state. The trivalent and pentavalent forms are abundance in waters studies (Fig 1) and these forms æ of high toxicity².

Figura 1. The Eh-pH diagram for mobility arsenic species in area studied:



Conclusion

As coal mining expose rock rich in iron sulfide (pyrite) to oxygen and water, the resulting acid drainage endangers aquatic ecosystems, in some cases for centuries. The valences of As occurrence in coal water in Santa Catarina zone are very toxic for health human with this persons living in the vicinity of such coal mining facilities or uncontrolled waste sites may also be exposed via water contamination.

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¹ Oliveira, L.F.S., International Workshop Medical Geology Metals, Health and the Environment, 2005, p.12 Rio de Janeiro.

² Tchounwou, P.B., Patlolla, A.K., Centeno, J.A., *Toxicologic Pathology*, 2003.31: 575-588.