Variation of chemical composition and style of transportation of elements in drainage water-bearing river water from an abandoned mine

Hinako Satoh[1], Daizo Ishiyama[1], Toshio Mizuta[1], Yukio Enda[2] and Koichiro Sera[3]

[1]Faculty of Engineering and Resource Science, Akita University
1-1 Gakuen-Machi, Tegata, Akita 010-8502, Japan

[2]Akita Prefectural Research and Development Center
4-11, Sanuki, Arayamachi, Akita 010-1623, Japan

[3]Cyclotron Research Center, Iwate Medical University
348-58 Tomegamori, Takizawa 020-0173, Japan

Abstract

The chemical contents of filtrate of mine drainage water-bearing river water in passage through a 0.45 μm filter and residues of the river water trapped the filter ware examined by the PIXE method to estimate the change in contents of chemical components and to know the style of transportation of the elements in drainage water from an abandoned mine.

The pH value of the mine drainage water ranges from 2.5 to 2.9, but the pH of the mine drainage water-bearing river water is 6.7 at the downstream part of the river. Aluminum in the river water is transported downstream as suspended particles larger than 0.45 μm in diameter. Iron changes from soluble iron and iron coexisting with suspended particles smaller than 0.45 μm to iron coexisting with suspended particles larger than 0.45 μm around pH of 4.5 according to the change from acidic pH to neutral pH. Zinc is transported far away from the mine as soluble zinc and zinc coexisting with suspended particles smaller than 0.45 μm.