

# PIXE Analysis of Carcinogenic Trace Elements in the Hot Spring Water

Keiko Chiba<sup>1)</sup>, Masahito Aminaka<sup>2)</sup>, Hiroshi Yamauchi<sup>2)</sup> and Kouichiro Sera<sup>3)</sup>

1) Science of Living Department, Morioka Junior College, Iwate Prefectural University  
152-52 Sugo, Takizawa, Iwate 020-0193 Japan

2) Department of Preventive Medicine, St. Marianna University School of Medicine  
2-16-1 Sugao, Miyamae, Kawasaki, Kanagawa 216-8511 Japan

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

## Abstract

To investigate the contents of carcinogenic trace elements in hot spring water, samples were collected from various parts of hot spring in Japan and were analyzed by the PIXE method. Chemical species of arsenic(As) in hot spring water were determined by atomic absorption spectrophotometry. Inorganic arsenic was the only chemical species of As detected in hot spring water and the most portion of which was made up of As(V). The sample contained a maximum of 1024 ng/ml of As. Other carcinogenic trace elements, such as chromium(Cr) and nickel(Ni) were detected from half the number of hot spring water.