

Effects of Silicic Acid on Environmental Stability of Spent Calcium-based Arsenic Adsorbents

*Hajime Sugita¹, Terumi Oguma¹, Ming Zhang¹, Junko Hara¹, Yoshishige Kawabe¹

1. National Institute of Advanced Industrial Science and Technology

In some areas of developing countries, health effects caused by arsenic contained in groundwater used as drinking water have been a serious problem. Calcium compounds show promise for arsenic removal as effective and inexpensive adsorbents. However, the spent adsorbent would contain a great amount of arsenic. When the spent adsorbent is not properly recovered and is discarded near residences, secondary environmental pollution due to arsenic leaching from the spent adsorbent may occur. In our previous studies (leaching tests with soils), it was suggested silicic acid which leached from soils greatly affects leaching behavior of arsenic from the spent adsorbents. In this study, in order to examine the influence of silicic acid on the environmental stability of spent adsorbents in detail, leaching tests with silicic acid solution and 2 kinds of spent calcium-based adsorbent (CaO and Ca(OH)₂) were carried out. This study revealed that when the initial silicic acid concentration in solution is high, the leaching rate of arsenic decreases. This was inferred that when the silicic acid component in the solution reacted with the calcium component eluted from the spent adsorbents to form the calcium silicate species, the arsenate component leached from the spent adsorbents was taken into the products.

Keywords: Arsenic Leaching, Spent Adsorbent, Calcium Oxide, Calcium Hydroxide, Silicic Acid