

Effects of Soils on Environmental Stability of Spent Magnesium-Based Arsenic Adsorbents

*Hajime Sugita¹, Ming Zhang¹, Terumi Oguma¹, Junko Hara¹, Shinya Takahashi²

1. National Institute of Advanced Industrial Science and Technology, 2. New Energy Development Co. Ltd.

Magnesium-based compounds (MgO , $\text{Mg}(\text{OH})_2$ and MgCO_3) have been expected as adsorbents for purifying arsenic contaminated water. However, the spent arsenic adsorbents would contain a great amount of arsenic. When the spent adsorbents were discarded into environment without proper processing, secondary environmental pollutions might be caused by arsenic leached from the spent adsorbents. Therefore, to evaluate on environmental stabilities of the spent adsorbents must be important.

In this study firstly, magnesium compounds adsorbed a large amount of arsenic were prepared as spent magnesium-based arsenic adsorbents. Then the spent adsorbent was placed together with soil and ion-exchanged water whose pH had already been adjusted in a test tube. The test tube was shaken in a temperature-controlled shaker at room temperature for 24 hours. Arsenic, magnesium and other main elements in the eluate filtered were quantitatively analyzed by using ICP-MS or ICP-AES. From the experimental results, MgO and $\text{Mg}(\text{OH})_2$ after being used as arsenic adsorbents were found to have higher environmental stability in all the soil tested. On the other hand, the spent MgCO_3 -based adsorbents were found to easily leach arsenic in sandy soils.

Keywords: Arsenic Leaching, Spent Adsorbent, Magnesium Oxide, Magnesium Hydroxide, Magnesium Carbonate