

## Leaching of Metal Cations from Basic Oxygen Furnace (BOF) Steelmaking Slag Immersed in Water

**Authors :** Umashankar Morya, Somnath Basu

**Abstract :** Metalloids like arsenic are often present as contaminants in industrial effluents. Removal of the same is essential before the safe discharge of the wastewater into the environment. Otherwise, these pollutants tend to percolate into aquifers over a period of time and contaminate drinking water sources. Several adsorbents, including metal powders, carbon nanotubes and zeolites, are being used for this purpose, with varying degrees of success. However, most of these solutions are not only costly but also not always readily available. This restricts their use, especially among financially weaker communities. Slag generated globally from primary steelmaking operations exceeds 200 billion kg every year. Some of it is utilized for applications like road construction, filler in reinforced concrete, railway track ballast and recycled into iron ore agglomeration processes. However, these usually involve low-value addition, and a significant amount of the slag still ends up in a landfill. However, there is a strong possibility that the constituents in the steelmaking slag may immobilize metalloid contaminants present in wastewater through a combination of adsorption and precipitation of insoluble product(s). Preliminary experiments have already indicated that exposure to basic oxygen steelmaking slag does reduce pollutant concentration in wastewater. In addition, the slag is relatively inexpensive and available in large quantities and in several countries across the world. Investigations on the mechanism of interactions at the water-solid interfaces have been in progress for some time. However, at the same time, there are concerns about the possibility of leaching of metal ions from the slag particles in concentrations greater than what exists in the water bodies where the "treated" wastewater would eventually be discharged. The effect of such leached ions on the aquatic flora and fauna is yet uncertain. This has prompted the present investigation, which focuses on the leaching of metal ions from steelmaking slag particles in contact with wastewater, and the influence of these ions on the removal of contaminant species. Experiments were carried out to quantify the leaching behavior of different ionic species upon exposure of the slag particles to simulated wastewater, both with and without specific metalloid contaminants.

**Keywords :** slag, water, metalloid, heavy metal, wastewater

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