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RECYCLING: REDUCE, REUSE & RECYCLE November 06-08, 2017 | Las Vegas, USA**Reuse of basic oxygen furnace (BOF) slag: Mitigation of high alkaline leachate generation from BOF slag****Seulki Jeong**

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Basic oxygen furnace (BOF) slag industrial waste from steel-making is generated by 7-9 million tons each year in Korea. BOF slag is reused as construction materials (e.g., land banking and road base). When BOF slags have contact with water however, BOF slag generates highly alkaline leachate (pH>12) by dissolved CaO located on the slags surface. This highly alkaline leachate adversely affects the surrounding environment thus, BOF slag should be appropriately treated prior to reuse. This study aims to mitigate alkaline leachate generation from BOS slag focusing on prevention of CaO dissolution through carbonation. A carbonation test was conducted where BOF slag and NaHCO₃ solutions (0.05, 0.1, 0.5, 1.0 M) were agitated with the ratio of 1:5 (g-slag: mL-solution) for 48 hr. The pH and Ca²⁺ concentration was measured for the leachate. Residual free CaO was measured and x-ray photoelectron spectroscopy (XPS) and thermogravimetric analysis (TGA) were conducted for the treated BOF slags. No significant difference of free CaO concentration was detected after carbonation indicating that NaHCO₃ treatment did not significantly affect reduce free CaO concentrations in BOF slags. However, the leachate pH of BOF slags slightly reduced from 12.0 to 11.3 at 1 M NaHCO₃ concentration. TGA and XPS analysis also confirmed that CaCO₃ was precipitated on the BOF slag surface after carbonation, preventing additional free CaO dissolution. The results suggested that produced CaCO₃ was precipitated on BOF slag forming a coating layer on the surface of BOF slag. The further decrease in leachate pH of BOF slag treated with CO₂ gas was obtained (from 12.0 to 10.3). CO₂ gas treating solution (pH 7.2) which led to leaching out more Ca²⁺ than NaHCO₃ did subsequently producing more CaCO₃ coating on the BOF slags. This finding is expected to contribute to developing appropriate treatments for safe and proper BOF slag reuse.

Biography

Seulki Jeong is working for Korea Basic Science Institute in Korea. She has her expertise in Environmental Remediation and Management. She is mainly interested in microbial-enhance remediation for contaminated soil with heavy metals such as Cd and As and its risk assessment. Currently, she also does research on environmental management using industrial wastes such as slags. Her research development of stabilization/solidification of heavy metals with steel slags and integrated environmental risk assessment is supporting by the National Research Foundation of Korea (NRF) grant funded by the Korea government.

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