

Remediation Technology for Abandoned Mine Waste with Coal Combustion Product (CCP)

Jae E. Yang¹, Sung C. Kim¹, Dong K. Kim¹, Se J. Oh¹, Hyun H. Kwon²,
Yeon S. Shim², Joo I. Ko² and Jin S. Lee²

¹Department of Biological Environment, Kangwon National University, Chuncheon, Korea; ²Korea Mine Reclamation Corporation (MIRECO), Seoul, Korea

KEYWORDS: remediation, mine waste, heavy metals, coal combustion product

ABSTRACT

Heavy metal pollution from abandoned mines to adjacent environment has been a critical issue due to production of acid mine drainage (AMD) in Korea. In addition, increased annual production and limited storage space for coal combustion product (CCP) required its utilization. Therefore, main objective of this study was to evaluate CCP as a heavy metal stabilizing agent for mine waste. Field experiment was conducted with 6 different treatments i) control, ii) Mine waste (MW) + CCP (20%) mix, iii) MW + CCP (40%) mix, iv) MW + CCP (40%) layer, v) MW + CCP (40%) + soil cover, vi) MW + CCP (40%) + soil mix. For all treatments, pH, heavy metal concentration, and crop growth were monitored. While the pH of control was fairly maintained at 3.16 during experimental period, increased pH (4.18-6.86) was observed as mixed amount of CCP was increased. Consequently, iron concentration was decreased (25.6-68.5%) as more CCP was mixed with mine waste mainly due to increased pH. However, no distinctive reduction of other heavy metals was observed. The result of crop growth also showed that addition of CCP has positive effect on crop growth (average grass length of CCP treatment: 32-61 cm) compared to control (5-10 cm). Overall, applying CCP to mine waste has a neutralization effect on AMD resulting reduction of heavy metals. In addition, no inhibition was observed for crop growth indicating that CCP can be used for heavy metal stabilization in mine waste.

**Submitted for consideration in the 2011 World of Coal Ash Conference,
May 9-12, 2011.**