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Commentary

Recycling coal combustion by-products for minesite rehabilitation

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ABSTRACT

The rehabilitation and closure of mines is often impeded by the presence of mine wastes (spoils, rejects, tailings) with undesirable chemical and physical properties that increase the risks of acid and metalliferous drainage, spontaneous combustion, salinity, dust generation, and erosion. At the same time, the various types of coal combustion by-products from power stations have unique chemical and physical properties such as an alkaline nature, pozzolanic binding effects, high water holding capacity, and particle size distributions which can be beneficial for mine rehabilitation. Many of the coal-fired power stations are located in close proximity to mines. The relatively short distance of coal mines and the power stations reduces the cost of coal transport. It also provides the opportunity to transport coal ash back to the mines at a low cost for the rehabilitation applications, including i) encapsulation and coating of the reactive materials (to prevent acid mine drainage and spontaneous combustion), ii) replacing of some of the costly soil amendment chemicals, iii) backfilling and stabilising final voids and underground workings, and iv) treatment of contaminated water. Our research aims to assess the effectiveness of the technology for improving physical and geochemical stability of mine wastes, and reducing any residual risks after mine closure, by testing the scenarios in which coal ash is reused..

Biography:

Mehdi Azadi obtained his PhD in Chemical Engineering, at The University of Queensland, Australia, after gaining his Bachelor and Master degrees in Chemical Engineering. Dr Azadi's research is currently focused on climate change adaptation technologies in mining industry. With an extensive knowledgebase and multiple skills, he has forged a career that includes mining waste management, mineral processing, separation technologies, and colloidal and interface science, all of which were developed and strengthened in the Academia, resource mining, and oil & gas sectors. As a research scientist and engineer in a multidisciplinary area, his work contributes to various industries by improving the traditional methods aiming for higher quality products and cleaner environment.