

# EMEC 22

22nd European Meeting on  
Environmental Chemistry

## BOOK of ABSTRACTS

5 – 8 December, 2022,  
Ljubljana, Slovenia



Univerza v Ljubljani  
*Zdravstvena* fakulteta



ASSOCIATION OF  
CHEMISTRY AND THE  
ENVIRONMENT





University of Ljubljana  
Faculty of Health Sciences



**22<sup>nd</sup> European Meeting on  
Environmental Chemistry**

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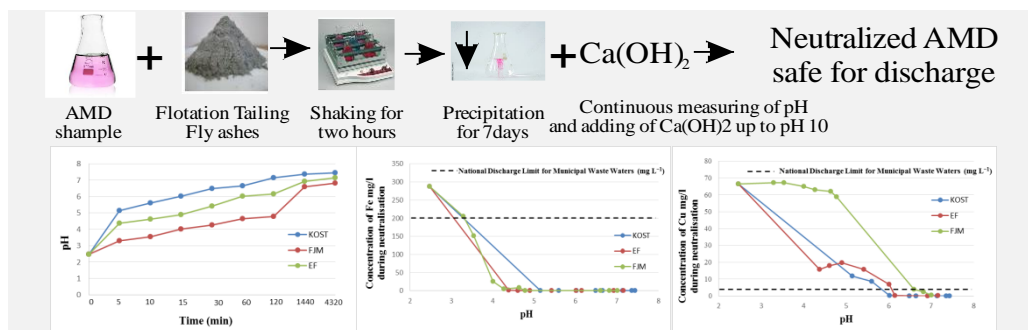
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## Sustainable Mining and Acid Mine Water Treatment

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The mining sector, nowadays, faces rising challenges to find suitable practice that are sustainable for already disposed waste streams (AMD, flotation tailings and fly ash) [1]. There is a growing tendency globally to use waste from various industries to neutralize AMD, which has both economic and environmental benefits. In attempt to connect mining waste with concept of sustainable development in the Republic of Serbia, several experiments were taken into consideration: neutralisation of AMD from Bor's mine with a) flotation tailings from copper mine Majdanpek (FJM) b) fly ash (FA) from thermal power Nikola Tesla (EF) and Kostolac (KOST). All three samples of alternative product are voluminous, hazardous waste products, difficult and expensive for safe deposition, causes environmental pollution (by spontaneous leaching of useful components, which causes additional investment in the rehabilitation of that or reversibly lost compounds that pollutes the environment, or its dispersion by wind in surrounding streams and groundwater resources of drinking water, air or soil and also degradation by soil erosion) and can affect human health's if are not regularly discharged. But its benefits are that there are free of charge alkaline wastes, suitable to neutralize the AMD by altering pH, which leads to precipitation of valuable metal which can be reused, such as Fe or Cu. The chemical and mineralogical composition of the initial samples of FJM and FA was evaluated two standard leaching tests: TCLP and EN 12457-4, as well as *Acid Neutralization Capacity* test. These base materials were shown to have a large capacity to neutralize acid, making

them a highly effective alternative material for neutralizing acid mine drainage and eliminating metals, even better than results of neutralisation with NaOH, as conventional reagent. According to the findings the FJM and FA neutralization experiments precipitated more than 99 % of Al, Fe, and Cu, 90 % of Pb, and 92 % of Zn. Leaching of these metals from FJM and FA raises Cd and Mn concentrations. Additional treatment was undertaken using hydrated lime to boost the pH to 10 and so offer circumstances for its removal, in order to reduce the concentration of Mn below the authorized limits by Serbian legislation. At the end, as a result of utilizing alternative materials such as FJM and two FA purified water, safe for release into the environment was obtained. In this way, resources are preserved for the future generation, and the treatment of already disposed amounts of waste reduces the contamination of the environment, the emission of toxic metals and the formation of acidic mine waters.

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