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Editorial

Earth Materials and Environmental Applications 2020

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The special issues of Earth Materials and Environmental Applications were published in 2015 and 2016 in *Adv. Mater. Sci. Eng.* Strong positive influence on the communities of geoscientists and environmental engineers resulted in our initiation of proposing the 3rd special issue in 2020. Due to the COVID-19 pandemic, the manuscript submission was seriously affected. As such, we had only 6 papers published in this special issue. Still, the special issue had research related to Earth materials from nuclear waste disposal, to deep well strip mining, and to use of Earth materials for contaminant removal from water. In the area of improvement of the permeability of clayey soil, double cutoff transverse relaxation times (T2 cutoffs) using low-field nuclear magnetic resonance (NMR) technology were developed. Studies on eight types of artificial clayey soil with different mineralogical compositions showed that the prediction accuracy of the improved model was much higher. In order to promote the sustainable use of oil shale residues, a novel subgrade material (SOF) composed of silty clay, oil shale ash residue, and fly ash was developed. The road performance, dynamic properties, and environment impact tests on mechanical property and environmental safety of an industrial residue waste subgrade material were evaluated. The deformation variation of the accumulation settlement of SOF under vehicle loadings after several years was far lower than the limit of expressway and Grade I highway. Furthermore, the chemical stability and toxicity of SOF leachates are in line with the benchmarks of Class II surface water and Class III ground water. In the area of surface and new building deformation analysis of deep well strip mining, advanced measuring instruments were developed on the stable surface of the old mining area and a simulation was used to determine the subsidence factor of different mining depths, mining widths, mining lengths, and mining thicknesses. The surface deformation was simulated and calculated, and the relationship between the different load positions, load sizes, loading building sizes, and the surface-activated deformation was determined. In another study, numerical modelling to predict the maturation of the clay barrier was developed to evaluate clay seal maturation in deep boreholes with nuclear waste and the results from simulation were compared to those from laboratory tests with good agreement. The effect of calcium carbonate on the mechanical properties and microstructure of red clay was studied by adding precipitated calcium carbonate to red clay at ratios of 0%, 5%, 10%, 15%, and 20%, and then, shear tests were conducted. The results showed that as the calcium carbonate content increased, the strength of red clay first decreased and then increased with a maximum strength obtained with 20% calcium carbonate. And, higher calcium carbonate content resulted in stronger agglomeration of red clay particles in the soil samples. In the study of sorptive removal of color dye safranin O (SO) by fibrous clay minerals and zeolites, it was found that the cation exchange capacity (CEC) of the minerals played a key role in SO^+ removal and the sorbed SO^+ cations were limited to the external surfaces of the minerals due to limited channel size of the fibrous minerals. In contrast, dense multilayers or admicelles of SO^+ formed on zeolite surfaces.

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Conflicts of Interest

We declare no conflicts of interest.

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