

Application of Enzyme-Mediated Calcite Precipitation for Surface Control of Gold Mining Tailing Waste

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Abstract : This paper studied the effects and mechanisms of fine-grained tailing by Enzyme-Mediated Calcite Precipitation (EMCP). Grouting solution used consists of reagents (CaCl_2 and $(\text{CO}(\text{NH}_2)_2)$) and urease enzymes which react to produce CaCO_3 . In sample preparation, the test tube is used to investigate the precipitation rate of calcite. The grouting solution added is 75 mL for one mold sample. The solution was poured into a mold sample up to as high as 5 mm from the top surface of the tailing to ensure the entire surface is submerged. The sample is left open in a cylinder for up to 3 days for curing. The direct mixing method is conducted so that the cementation process occurs by evenly distributed. The relationship between the results of the UCS test and the calcite precipitation rate likely indicates that the amount of calcite deposited in treated tailing could control the strength of the tailing. The sample results are analyzed using atomic absorption spectroscopy (AAS) to evaluate metal and metalloid content. Calcium carbonate deposited in the tailing is expected to strengthen the bond between tailing granules, which are easily slipped on the banks of the tailing dam. The EMCP method is expected to strengthen tailing in erosion-control surfaces.

Keywords : tailing, EMCP, UCS, AAS

Conference Title : ICGIGE 2020 : International Conference on Ground Improvement and Geotechnical Engineering

Conference Location : London, United Kingdom

Conference Dates : October 22-23, 2020