

Utilizing Travertine Waste in Sustainable Pervious Concrete Pavement for Heavy Metal Mitigation and Urban Runoff Reduction

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ABSTRACT

Waste travertine aggregates were used first to produce the pervious concrete (TAPC) greater than 30 MPa, which improved the resource use rate of travertine waste materials generated during travertine mining. Then, the effectiveness of TAPC was assessed using various travertine waste powder rates to replace cement usage. Although TAPC with powder (TAPPC) becomes lighter and demonstrates good freeze-thaw resistance, it has a reduced compressive strength. Compared to the fast approach (< 21.0%), the removal rate of different heavy metals by TAPPC under the soaking method (> 86.5%) was much higher. Besides, the TAPPC's capacity to eliminate heavy metals can also be enhanced by the addition of travertine powder. Ultimately, a rainfall system-equipped TAPPC pavement (TAPPCP) was created to evaluate the water quality and quantity. After an hour, 65–88% of urban runoff could be removed by TAPPCP under different input intensities, and after 30 minutes, TAPPCP could remove more than 97% of cadmium, copper and lead.

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