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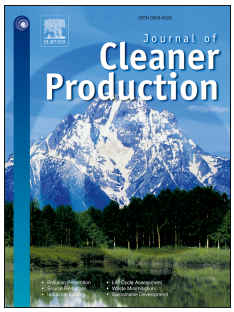

Characteristics and the recovery potential of plastic wastes obtained from landfill mining

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Characteristics and the recovery potential of plastic wastes obtained from landfill mining

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Abstract: Plastics have been the most consumed materials of human societies in recent decades and, in the mean time, one of the major products obtained from landfill mining. Characteristics of the landfill mined plastic wastes and their recovery potential were the key points to determine the feasibility of landfill mining projects. We collected municipal solid waste samples of different storage years from the landfill and did mechanical screening and manual separating to sort out plastic wastes, and a typical old landfill, which is of 24 storage years and located in central China, was taken as our studied case. According to our research, plastic wastes accounted for 10.62±5.12% of the total stored wastes in the old landfill, among which, 69.13% was plastic bags (white PE plastic bags accounted for 11.34%; colored PE plastic bags 29.77%; other plastic bags 28.02%), and 30.87% was other plastics (incl. PP, PVC, PS, etc.). The average moisture content in the plastic waste was 19.96±4.65% and the average impurities content was 71.02±6.31% before manual washing and cleaning. The VS, ash, fixed carbon and calorific value of manually cleaned plastic wastes were 87.09±0.55%, 10.84±1.19%, 2.07±0.85% and 43.18±1.49 $MJ.kg^{-1}$, respectively. Elements testing (C, N, O, S, Cl, Si, Al) and surface images analysis under scanning electron microscope showed that normal cleaning techniques had a difficulty in thoroughly getting rid of all the impurities on the surface of plastic bags excavated from old landfill, which will impede plastic wastes from being mechanical recycled as renewable materials or being chemically recycled by either