The simulation of the oxygen transport with injection well operation in landfill

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Evaluation of oxygen distribution during aeration in landfill was very important to determine the design parameters of injection well. The coupling model described gas preferential transport in landfill was developed, which linked the effect of advection-diffusion and oxidation reaction and mass exchange between the fracture and matrix system. Combined with the typical cases in field site, the quantitative simulation of the variation of gases distribution during vertical well aeration in short term was presented. The sensitivity of the parameters in the coupling model to gas transport was addressed. The simulation result shown that the oxygen and methane concentration during aeration was represented by using the dual advective-diffusive model (DAD model). The aeration radius achieved by DAD model was closer to the measurement value. It was underestimated by single advective-diffusive model (SAD model). The mass transfer volume between the fracture and matrix system greatly contributes to gas preferential flow effect in landfill. The aeration radius (AR) was obviously influenced by the diffusion coefficient. It will provided evidence for optimum design of gas injection well in aerobic landfill.

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