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Influence of Hydraulic Gradient on Antifouling of Property Natural Heterogeneous Clay

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Natural clayey soil is an anti-fouling laying with good anti-fouling performance. However, natural clayey soil has significant structured heterogeneous characteristic in terms of spatial distribution, making it significantly different from the anti-fouling performance of standard landfill system. The homogeneous clay stratum of standard landfill system ignores the advection and transport process of pollutants. Only the dispersion and absorption processes of pollutants under the homogeneous condition need to be considered. By building the medium structures of different natural heterogeneous clayey soils, a two-dimensional transport model of pollutants in the saturated clayey soil was established using the Feflow numerical simulation software, so as to research the influences of hydraulic gradient of groundwater with heterogeneous structure on the anti-fouling performance. The results show that the hydraulic gradient of groundwater has certain influences on the anti-fouling performance of heterogeneous clayey soil. As the hydraulic gradient increases, the anti-fouling performance of heterogeneous clayey soil gradually decreases. When the hydraulic gradient increases from 0 to 0.1, the changes of hydraulic gradient significantly affect the anti-fouling performance of heterogeneous clayey soil. Besides, the relative maximum anti-fouling rate of clayey soil decreases by 82.4% and the relative vertical anti-fouling rate decreases by 35.1%. In areas with polluted groundwater resulting from the long-term stockpiling of industrial waste, the research results of this paper will provide important references for in situ prevention, control and repair of groundwater pollution.