Organic matter removal mechanism in artificial soil rapid infiltration system

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The artificial soil rapid infiltration system (ASRI), an ecological wastewater treatment technology, excels in removing organic pollutants and SS in sewage. In order to study the organic matter removal mechanism in ASRI, the removal rate and form change of the organic pollutants and microorganism distribution within the different height of the ASRI are analyzed.

The results of pilot test indicated that: under this experimental condition, the reduction of the organics in the ASRI mainly occurred within the 0-30cm substrate below the pipe distributor, and the smaller the hydraulic load of influent, the higher the removal ratio of the organic pollutants in the substrate section. When the ASRI used the coarse sands as the substrate and kept the influent hydraulic load less than $1.0m^3/(m^2 \cdot d)$, the effective height of the organics removal was 90cm. It also showed that the average degradation rate of different kinds of the organic pollutants has a maximum value in the 0-30cm substrate section below the pipeline. Furthermore, the degradation ratio of different kinds of the organics falls badly with increase in depth of the longitudinal direction. In the ASRI infiltration tank, many different kinds of microorganisms distribute widely, however, the amount and space distribution are different. In amount, aerobic bacteria are three classes higher than fungi, actinomyces and anaerobic bacteria. In space, they all reduce in amount from the surface layer to the bottom layer gradually with different forms [1].

The relationships between organic pollutants removal results and microorganisms amount within infiltration tank layers show that amount of aerobic bacteria has remarkable relativity with removal rate of COD, and organic pollutants are mainly degraded by aerobic bacteria.

[1] Wenlai Xu & Jianqiang Zhang (2009) *ICBBE*, **3**.

Multiplicity of the North China Craton destruction: Constraints from metasomatic types and zircon U-Pb ages from peridotite xenoliths entrained by Mesozoic high-Mg# diorites

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A suite of peridotite xenoliths including harzburgite, wehrlite, dunite, and orthopyroxenite entrained by the Early Cretaceous high-Mg# diorites in the eastern North China Craton (NCC) provide insight into the timing of the destruction of the North China Craton [1]. These harzburgite xenoliths have Archean Re-depletion model ages (T_{RD}=2.60-2.68Ga)[2], implying a lithospheric mantle origin. Veined and zoned orthopyroxenes surrounding chromite, occurred in spinel-harzburgite and chromite-bearing dunite, suggest that these peridotite xenoliths had been modified by a silicate-rich melt. Secondary amphibole and phlogopite from harzburgite and dunite xenoliths indicate that they could have experienced modification of a hydrous melt, whereas the occurrence of veined dolomite and metasomatic clinopyroxene in dunite and wehrlite xenoliths implies that they had been modified by a carbonatitic melt/fluid. Zircon SHRIMP U-Pb dating results indicate that these dunite xenoliths contain zircons with ages of 142±4Ma (accounting for 70% of the zircon population), 161±8Ma, 261±9Ma, 432±6Ma, 456±15Ma, and about 510Ma. These ages imply that the lithospheric mantle in the NCC could be subjected to modification of multiple events, including the Pan-african, Calidonian, Hercinian, Yanshan movements occurred in the NCC and other continents, Taken together, it is suggested that the destruction of the North China Craton could experience the modification of multiple tectono-magmatic thermal events.

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