

Nano Bubble Transport in Saturated Porous Media: Effects of Chemical Properties in Nano Bubble Water

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Nano-bubbles (NBs) have a considerable potential for the remediation of soil and groundwater contaminated by organic compounds, especially when used in conjunction with bioremediation technologies. Understanding the transport mechanisms of NBs in soils is essential to optimize NB-based remediation techniques. In this study, transport experiments in a column packed with glass beads (size fraction of 0.1 mm) were conducted, where NBs created by oxygen gas were injected to the column. The NBs concentration in the effluent was quantified using a resonant mass measurement technique (Archimedes, Malvern Instruments) which can separately count bubbles and particles in water. Effects of chemical properties of the NBs water (i.e., pH and ionic strength) on NB transport in the porous media were investigated. The results showed that attachment of NBs was enhanced under higher ionic strength and lower pH conditions. Around 70% of the NBs applied to the column were retained at pH 5 conditions, while almost of all NBs were released at pH 11 conditions.

Keywords: Nano bubbles, Transport, Porous media, pH, Ionic strength