INFILTRATION OF DNAPL IN HETEROGENEOUS POROUS MEDIA

Dardouri. Sana , Sghaier. Jalila , Bellagi. Ahmed
National Engineering School, Unit of research for Thermal and Thermodynamics of industrial processes, Monastir, 5019, Tunisia

*Correspondence author: Dardouri Sana; Email: sanadardouri_en@yahoo.fr

Keywords: Dense nonaqueous phase liquid (DNAPL), heterogeneity, residual saturation, permeability, infiltration

Section: Experimental and Measuring Techniques

ABSTRACT

The contamination of soil and groundwater by useful products used in industry remains a problem to solve. These products as the chlorinated solvents have a complicated behavior seen their strong density, their low solubility and their low biodegradability which allows them to persist and to exist a long period in the ground.

The objective of this work is to study the behavior of two chlorinated solvents in unsaturated soil at laboratory scale. The experimental implement is constituted of a soil column equipped with tensiometers to measure the load pressure and the sampling probes to quantify the DNAPL saturation in the medium at different positions of the column. The extraction of the liquid solution from the medium is removed with methanol and it is made during all the experience. The quantification is made by analysis with chromatography with gaseous phase (CPG) after successive extraction of the solution. The effect of the medium heterogeneity is experimentally studied by using two samples. The first is constituted by sand with a percentage of blended or stratified laminated silt. The second is a mixture of sand and clay. These experiments allow us to show the effect of the intrinsic permeability of the medium on dissolution, trapping and DNAPL transport.

A numerical simulation of multiphase flow in a homogeneous and heterogeneous media clearly shows the influence of the intrinsic permeability on the infiltration velocity of various phases present in the poral volume.