

## 離散裂隙的多孔介質中膠體促進的污染物傳輸

### 1. 數值方法與敏感性分析

Ibaraki, M., Sudicky, E.A., 1995. Colloid-facilitated contaminant transport in discretely fractured porous media. 1. Numerical formulation and sensitivity analysis. *WATER RESOURCES RESEARCH*, **31(14)**, 2945-2960.

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報告日期：2022/05/20

#### 摘要

本研究開發了一個可考慮離散裂隙的多孔介質中膠體促進傳輸機制的二維數值模式。其中考慮了水相污染物在裂隙和多孔基質中的遷移、膠體在裂縫中的傳輸與溶質的吸附。由於考慮到膠體的深層濾床過濾，因此溶質可被吸附在移動膠體和過濾膠體上。根據 Langmuir 或 Freundlich 等溫線，數值方法允許在裂縫壁、基質固體以及可移動和過濾的膠體上進行平衡或動力學吸附反應。經由一系列在平行裂縫系統的模擬結果，顯示了移動膠體對污染物遷移的重要性，並證明如果吸附到膠體上是一個緩慢的動力學過程，將會導致移動的膠體對於污染物遷移的影響會更顯著。

## **Colloid-facilitated contaminant transport in discretely fractured porous media**

### **1. Numerical formulation and sensitivity analysis**

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**Abstract.** A two-dimensional numerical model is developed that incorporates the mechanism of colloid-facilitated transport in discretely fractured porous media. The numerical model accounts for aqueous phase contaminant transport in the fractures and the porous matrix, colloid transport in the fractures, and sorption of the solute. Deep-bed filtration of the colloids is accounted for, and the solute is allowed to sorb on both the mobile and filtered colloids. The numerical formulation allows for either equilibrium or kinetic sorption reactions onto the fracture walls, the matrix solids, and the mobile and filtered colloids according to either a Langmuir or a Freundlich isotherm. The results of a series of simulations involving a system of parallel fractures explore the importance of mobile colloids on contaminant migration and indicate that if sorption onto the colloids is a slow kinetic process, then the mobile colloids may lead to significantly enhanced contaminant migration.