



Analytical solutions for two-site colloid transport with reversible and irreversible attachment

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Analytical solutions for the transport of colloid particles in water saturated, one-dimensional, homogeneous porous media, under fully developed uniform flow are presented. The colloids can be either suspended in the aqueous phase or attached reversibly and/or irreversibly onto the solid matrix. The colloids can be either of neutral density or denser than the water. For dense colloids, gravity effects are accounted for. Gravity may enhance or hinder the migration of dense colloids, depending on the flow direction. Upstream boundary conditions for both instantaneous and broad-pulse injections are accounted for. The analytical models were used to successfully fit available experimental data.