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\textbf{Comparing Retention and Transport of a Human Pathogenic Virus and a Surrogate Bacteriophage in Porous Media}

Yan Jin

University of Delaware, Department of Plant and Soil Sciences, Newark, Delaware, United States (yjin@udel.edu, 302 831 6962)

Accurate assessment of risks associated with virus contamination of groundwater requires sound understanding of interactions between viruses and porous media. Although retention and transport of bacteriophages, as surrogates of human enteric viruses (HEVs), have been investigated quite extensively, similar studies with emerging HEVs are largely missing. Thus, whether bacteriophages are suitable models for evaluating environmental fate of HEVs remains unknown. Moreover, traditional colloidal theories (e.g., DLVO and filtration theory) may not apply to viruses because of their complex surface morphology and properties. We conducted column experiments to compare retention and transport of a HEV (Adenovirus 41) and a model bacteriophage (ϕX174) in saturated sand columns in terms of their breakthrough behavior, mass recovery, and competition for attachment sites. In addition, adhesion forces between viruses and sand particles were measured with atomic force microscopy (AFM). Applicability of classic DLVO theory to describe virus-solid interactions will also be discussed.