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# An analytical model for multispecies reactive transport through a heterogeneous formation consisting multiple layers of differing physical and chemical properties

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Transport behaviors of contaminants through a heterogeneous formation consisting multiple layers are complicated because of the different physical and chemical properties for each individual layer. Few analytical solutions for single-species contaminant transport in a multi-layer heterogeneous formation have been reported in the literature. Some contaminants of concern such as radionuclide, nitrogen and chlorinated solvents can decay or degrade to form new successor products during their transport processes, thus making migration of these contaminants much complicated. Clearly, analytical models for multispecies transport coupled by a series of decay reactions in a multi-layer formation are useful tools for synchronous determination of the fate and transport of the predecessor and successor species of decaying or degradable contaminants. This study attempts to develop an analytical model for the multispecies reactive transport of degradable or decaying contaminants through a multi-layer heterogeneous formation. The derived analytical model is shown to be correct and accurate as the consistent results of comparisons between the derived analytical model and the numerical model. The developed analytical model will provide a more reliable predicting tool for real world application.