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## Filtration of core–shell colloids in studying the dewatering properties of water-swollen materials

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### Abstract

The properties of filter cakes formed by the deposition of suspended particles play important roles in numerous filtration applications. As the properties of suspensions of biological/organic origin differ markedly from classical filtration properties derived from inorganic suspensions, organic polymer particles with core–shell morphology have been synthesized and applied in dead-end filtration experiments. These particles, with a dense polystyrene core and a water-swollen gel-like poly(acrylic acid) shell, have been made with varying shell–core volume ratios and particle sizes. Filtration results show that the specific filter cake resistance is more dependent on the volume fraction of the shell than on particle size, and that the filter cakes exhibit pressure-dependent compressibility with a linear correlation with shell volume fraction. Furthermore, the primary consolidation of the filter cakes was investigated and linked to the particle properties, again exhibiting dependency on both shell fraction and applied pressure.

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