

THE SEPARATION OF OIL FROM DRILL CUTTINGS USING IONIC LIQUIDS

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Ionic Liquids (ILs) are materials whose constituents are ions, like common table salt, except that they are liquids below 100°C. As a result of their ionic nature, they have unusual solvent properties. We have found that bitumen can be cleanly separated from medium- and low-grade Canadian oil sands and also Utah tar sands using certain ionic liquids. The separation of oil from drill cuttings and contaminated beach sand has also been accomplished. Essentially, the separation involves simply mixing the components at room temperature and allowing a phase separation into three components: minerals, which remain at the bottom of the separation vessel, a middle layer of ionic liquid and a top layer of hydrocarbon. Separation can then be achieved using standard solid/liquid and liquid/liquid methods.

Separation of bitumen from tar sands is relatively easy, but separating residual oil from drill cuttings is more difficult, because of the large amounts of surfactants that help make the minerals “oil wet”. However, if a volatile solvent (for easy removal from the oil used in drilling muds using vacuum distillation) is included, separations are straightforward and are accomplished at room temperature.