The Removal of Organic Contaminants from Produced Water with Ionic Liquids

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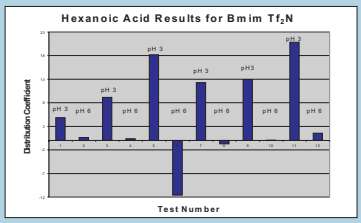
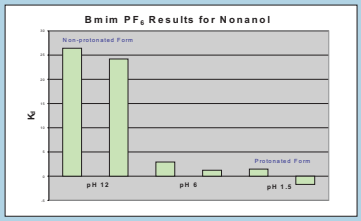
Gas Chromatograph





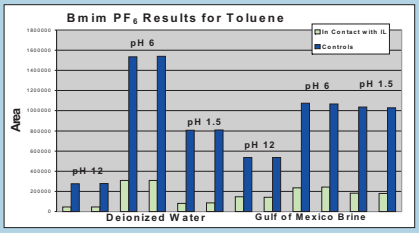
What are Room Temperature Ionic Liquids?

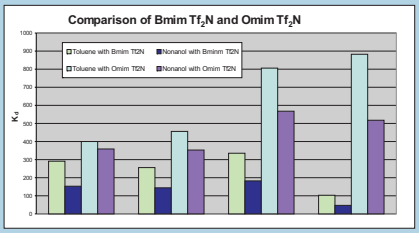
1. Room Temperature Ionic Liquids are composed entirely of ions.
2. RTILs are salts that are liquid at room temperature.
3. They have low melting points and high boiling points.

Why are Ionic Liquids so Great?

1. Ionic liquids are considered to be green solvents, meaning they are not known to destroy or deplete the environment.
2. They have negligible vapor pressure.
3. They are much less corrosive then the organic solvents used for extraction now.
4. They are recyclable.
5. The properties of the ionic liquid can change just by changing the cation or anion. They can be engineered to suit your purposes.

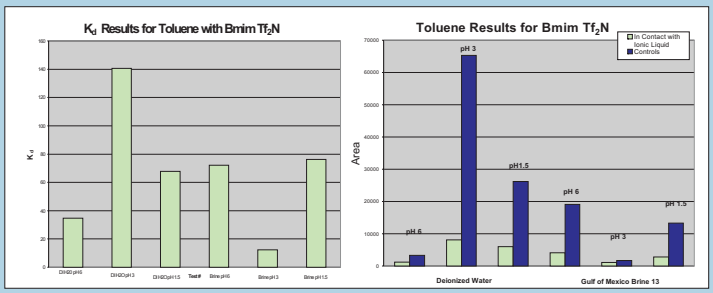
High Performance Liquid Chromatograph

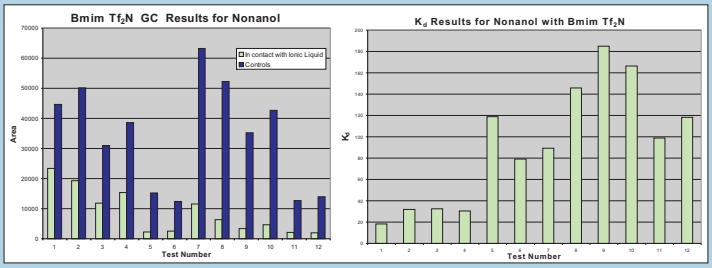




Results for Bmim Tf_2N and Omim Tf_2N

1. Salinity had no effect on the uptake of organics into the ionic liquid but did have an effect on the analysis.
2. Lactic acid, succinic acid, and butanediol were not significantly removed by the ionic liquids.
3. Omim Tf_2N was the best for pulling toluene (K_d of 800) and nonanol (K_d of 560) out of produced water.
4. Removal of hexanoic acid was pH sensitive, with the protonated (pH 3) form of the acid was pulled out into the ionic liquid.





Results for Bmim PF_6

1. Salinity had an effect on the uptake of organics into the ionic liquid.
2. Nonanol was pH dependent with the non-protonated (pH 12) form being pulled into the ionic liquid.
3. 1-Nonanol had a K_d of about 26, and toluene had a K_d of about 190.
4. Lactic acid, succinic acid, and acetic acid were not significantly removed by the ionic liquid.

Work funded by the United States Department of Energy, contract number AB0538OR411, and through the Community College Initiative.