

Title:

Supported ionic liquids for the removal of pharmaceuticals from aqueous solutions

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Abstract:

The presence of organic pollutants has been shown to have adverse effects on humans and the environment. Mainly due to their large worldwide consumption, active pharmaceutical ingredients (APIs) were already found in a wide variety of environmental aqueous samples, in concentrations ranging from ng/L to µg/L. Therefore, the treatment of water contaminated with these compounds is extremely important.

Ionic liquids (ILs) have a great potential to remove a large array of compounds from aqueous solutions¹, including pharmaceuticals². Despite the several advantages associated to ILs, their immobilization in materials - supported ionic liquids (SILs)³, would overcome some leaching problems. Based on the high potential of SILs in separation/removal techniques and on the health and environmental concerns that we aim to overwhelm, silica-based SILs were investigated to remove pharmaceuticals from aqueous solutions.

Several SILs were synthesized, and adsorption kinetics and adsorption isotherms were determined for sodium diclofenac, ketoprofen, naproxen and acetylsalicylic acid. The adsorption mechanisms and maximum equilibrium concentrations depend on the SILs chemical structure and on the drug under study. Overall, the synthesized SILs are efficient adsorbents for pharmaceuticals and perform better than activated carbon typically used for similar purposes.

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