ISGC 2022

N°346 / OC
TOPIC(s) : Homogenous, heterogenous and biocatalysis / Alternative solvents

Ionic Liquid Gel Raincoats for Homogeneous Catalysts and Biocatalysts.

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PURPOSE OF THE ABSTRACT

Enzymes and homogeneous catalysts can be sensitive to other chemicals and the pH of their reacting environment, leading to poisoning and decomposition. To improve the sustainability of a chemical transformation, catalysts and biocatalysts must be reused as much as possible and such interactions should be avoided. We are investigating the use of gels that comprise a solid matrix and an ionic liquid to protect catalysts in aqueous solution. The ionic liquid is tuned to provide an ideal reaction environment and the catalyst is co-entrapped with the ionic liquid within the matrix. In this way the material acts like a raincoat and the ionic liquid like a waterproof coating.

The use of an ionic liquid gel to protect a homogeneous catalyst was demonstrated for the peroxidase mimic Fe-TAML. [1] This peroxide activator has been previously shown to assist the destruction of many harmful contaminants in water. [2] A basic ionic liquid was co-entrapped with Fe-TAML in a silica gel. The resultant material was shown to activate peroxide and oxidize dyes in aqueous solution. Gel entrapment rendered the catalyst easily separable and recycled.

In this paper the application of ionic liquid gel raincoats will also be discussed for isolated enzymes. In this case the bespoke ionic liquid environment serves to stabilize the protein structure, as well as render the enzyme recyclable. [3,4]

FIGURES

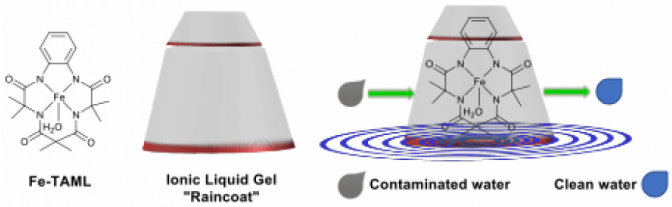

FIGURE 1

Fe-TAML in an ionic liquid gel raincoat.

Entrapping peroxidase mimic Fe-TAML in an ionic liquid gel raincoat facilitated easy separation and recycling.

FIGURE 2

KEYWORDS

Ionic liquid gel | Aqueous catalysis | Biocatalysis | Homogeneous Catalysis

BIBLIOGRAPHY