

ADVANCED ADSORBENTS AND BIOCATALYSTS FOR ENVIRONMENTAL APPLICATIONS

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Hybrid organic-inorganic materials have broad perspective of application due to combination of functional components. They can be based on inorganic matrices such as porous or dense silica, aluminosilicates and metal oxide materials grafted with organic or bio-ligands. Nano components are applied to exploit the large surface area, specific properties related to nano dimensions and nano confinement, and increase the load of active functions.

The grafted ligand layer can be tailored to become highly specific, permitting to selectively separate different metal cations even with very close chemical properties [1-2]. This approach can be successfully used for recycling of critical elements. Another domain of its use is water purification. Application of different organic functions permits to address simultaneously different classes of water pollutants using a single column of a hybrid adsorbent [3]. Combining chelating functions with enzymatic biocatalysts it is possible to create materials for enzymatic water treatment that are very stable to presence of hazardous metal cations in solution [4] (see Fig. 1).

Proposed approaches open prospects for development of circular economy and finding environmental solutions for sustainable future.

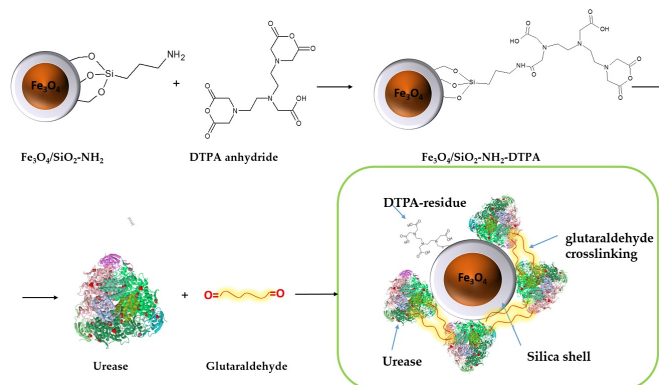


Figure 1. Simultaneous grafting of ligand functions for metal cation binding and of biocatalysts [4].

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