**Abstract**

Supramolecular hydrogels have attracted increasing interest in recent years because of their ability to incorporate high levels of proteins, cells, antibodies, peptides and genes. In this work, we propose a new approach to confinement of Candida Antarctica lipase B (CALB) within a supramolecular silicified hydrogel based on Pluronic F127 and α-cyclodextrin (α-CD). After functionalization of the matrix, the catalytic performance of the supported biocatalyst was evaluated in the oxidation of 2,5-diformylfuran (DFF) to 2,5-furandicarboxylic acid (FDCA), a fully biosourced alternative to terephthalic acid used in the production of polyethylene terephthalate (PET). Our results revealed that while CALB immobilized in conventional sol-gel silica yielded exclusively 5-formyfuran-2-carboxylic acid (FFCA), confinement of the enzyme in the silicified hydrogel imparted a 5-fold increase in DFF conversion and afforded 67% FDCA yield in 7 h and almost quantitative yields in less than 24 h. The hierarchically interconnected pore structure of the host matrix was found to provide a readily accessible diffusion path for reactants and products, while its flexible hydrophilic-hydrophobic interface was extremely beneficial for the interfacial activation of the immobilized lipase.

**Speaker Publications:**
4.” Robust Mesoporous CoMo/γ-Al2O3Catalysts from Cyclodextrin-Based Supramolecular Assemblies for Hydrothermal Processing of Microalgae: Effect of the Preparation Method” Journal of Applied Materials & Interfaces, vol-10, Issue-15, 2018

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