Biocatalytic CO_2 conversion using 3D-Printed interfacial devices at gas-liquid interface

옥중복, 김한솔, 김중배†, 주영준, 홍성길
고려대학교

Carbonic anhydrases (CAs) catalyze the interfacial conversion of carbon dioxide (CO_2) into bicarbonate with a high catalytic turnover number ($1x10^6$). Here, we develop a density adjustable 3D-printed platform, which can accommodate CA immobilized electrospun polymer fibers and enable the positioning of immobilized CA in a biphasic system. By using this system, we can accelerates CO_2 conversion by 1.8- and 3.4-fold when compared to reactions performed with immobilized CAs within the aqueous solution and without immobilized CAs, respectively. The CA-loaded interfacial device retained 99.3 % of its initial CO_2 conversion rate after ten recycles in an aqueous buffer at 4 ℃ for 459 days.