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Self-Assembling of Polymer-Enzyme Conjugates at Oil/water Interfaces[1] BI-MIN ZHANG NEWBY, LIFANG WANG, PING WANG, The University of Akron — Interface-binding enzymes are desirable for biphasic reactions in that they offer simultaneous access to substrates dissolved in both phases across the interface. It has been shown that conjugating water-soluble enzymes with hydrophobic polymers facilitated the assembling of enzymes at oil/water interfaces. In this work, the interfacial assembling of alpha-chymotrypsin conjugated with polystyrene, poly(methyl methacrylate) and poly(L-latic acid) was examined using the pendant drop method. The interface-assembling process of the conjugates from the organic phase followed a similar pattern of that of native alpha-chymotrypsin from the aqueous buffer phase, i.e., the interfacial tension decreased gradually with time. However, when the conjugates were dispersed in the form of particulates in the aqueous phase, in which the conjugate was insoluble, the assembling occurred faster and the interfacial tension approached zero quickly. It was suspected that the assembling in this case involved two steps, i.e. the adsorption of the particulates and the subsequent rearrangement, dissociation and re-dispersion of the conjugates at the interface. The effect of other factors including the polarity of organic solvent, pH value and ionic strength of the aqueous phase was evaluated. It was found that the polar solvent slightly facilitated the assembling, whereas pH and ionic strength showed minimal effects.

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