

## **467e Single Enzyme Nanoparticles**

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Nanoparticles and nanoparticle-based materials are attracting great interest for their unique properties and potential for application in diverse areas. We have developed a synthetic approach for the preparation of single enzyme nanoparticles (SENs), in which each enzyme molecule is surrounded by a hybrid organic/inorganic polymer network. The synthetic procedure consists of modification and two orthogonal polymerization steps. This SEN approach has been successful in stabilizing several enzymes in a vivid way. In addition, the nanoscale structure around the enzyme is sufficiently thin enough not to impose a significant mass transfer limitation on the substrate. Because these nanoparticles remain soluble or suspended in solutions, they can be processed into a variety of forms. They can be used in solution, cast into thin films, or adsorbed within larger mesoporous structures. Given enzymatic specificity and the great diversity reactions catalyzed by enzymes, coupled with the flexibility in the use of single enzyme nanoparticles, these new nanostructures are promising for many applications including biosensors and bioconversion.