EXPERIMENTAL METHODS:

Biosilification reactions: In a typical procedure, R5 peptide (100 mg/ml) and catalase (10mg/ml), horseradish peroxidase (10mg/ml) or nanoparticles were dissolved in sodium phosphate buffer pH 7.5 in a microcentrifuge tube. A freshly prepared solution of tetramethoxysilane in 1 mM HCl was then added to this solution to a final concentration of 0.1 M. The reaction was incubated for 5 min on the benchtop. The precipitate was centrifuged at 14,000 *g* for 5 min. The pellet was then washed several times with sodium phosphate buffer pH 7.5 containing 0.2% Tween-20. The silica precipitate was resuspended and stored in sodium phosphate buffer pH 7.5. In some cases, the silica precipitate was stored as a dry powder. Streptavdin conjugated CdSe@ZnS nanoparticles (QD605) were purchased from Quantum Dot Corpration (USA). Iron oxide nanoparticles were purchased from Aldrich Chemicals. CoPt nanoparticles were synthesized as described.[9]

Enzyme Assays: Horseradish peroxidase (HRP) activity was monitored using 2,2'-Azino-bis[3-Ethylbenzthiazoline-6-Sulfonic acid] (ABTS) as substrate. ABTS is a widely used substrate for peroxidase and produces a green colored product that can be read spectrophotometrically at 405 nm. The activity of the immobilized catalase was monitored using hydrogen peroxide as a substrate. The decomposition of H_2O_2 into water and oxygen by catalase can be measured by a decrease in absorbance at 240 nm.

SUPPLEMENTAL FIGURES:

Fig S1. Reusability of the entrapped enzyme. The catalase entrapped silica matrix can be reused several times by separating the silica matrix from the product by centrifugation (10,000 x *g* for 5 min), washing the matrix with buffer several times and then repeating.

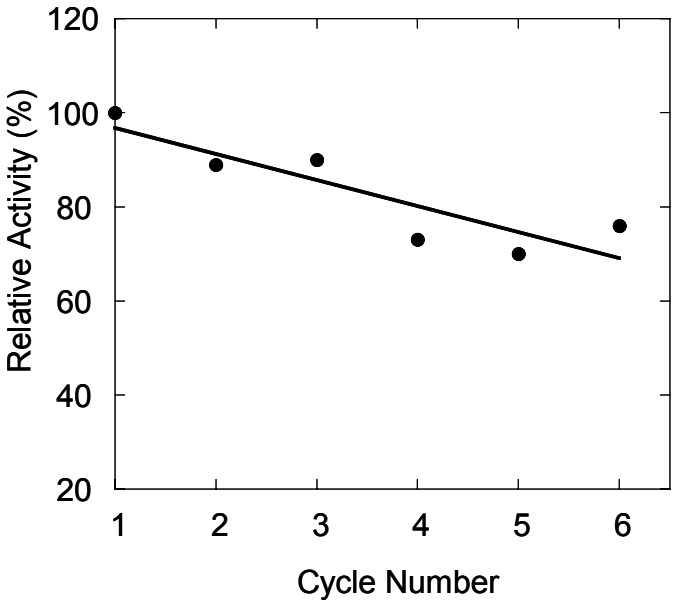

Fig. S1