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Improving reaction rates by confinement within biocompatible polymers CECILE MALARDIER-JUGROOT, XIA LI, MICHAEL N. GROVES, Department of Chemistry and Chemical Engineering, Royal Military College of Canada, MANISH JUGROOT, Department of Mechanical and Aerospace Engineering, Royal Military College of Canada — The most efficient catalysts have been developed and optimized by living systems. Indeed, in vivo enzyme-catalyzed reactions are several orders of magnitude more efficient than platinum based catalyzed reactions. However, the rate of reaction and equilibrium interactions are considerably reduced when the biological systems are studied in vitro. This phenomenon is largely attributed to the effect of confinement or macromolecular crowding present in the cell. This paper will present the comprehensive characterization of amphiphilic polymeric template with hydrophobic cores inducing 1D and 2D confinement on hydrophobic reactants diffusing within the templates. The paper will show that effect of confinement allows reactions to occur without external factors essential for these reactions to occur in the bulk. The products synthesized in a very controlled environment within amphiphilic polymeric nanotubes and nanosheets are monodispersed at the nanoscale ($\sim$ 2nm). The effect of confinement opens new possibilities for environmentally friendly synthesis of novel nanoscale materials.

Cecile Malardier-Jugroot
Department of Chemistry and Chemical Engineering,
Royal Military College of Canada

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