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**Confinement: the essential property for biomimicry** CECILE MALARDIER-JUGROOT, MATT MCTAGGART, MANISH JUGROOT, Department of Chemistry and Chemical Engineering, Royal Military College of Canada, Kingston, ON, Canada — In the past decades, nanotechnology has been one of the most prolific research area opening new avenues for applications in larger part due to the novel physical properties unveiled at the nanoscale. We will present in detail the development of efficient nanoreactors mimicking biological systems by combining confinement effect and high catalytic activities with gold as catalytic center. The fine structure of the polymeric template forming the shell of the nanoreactor was shown to be molecular weight dependent [1] and allows the control of a 2D or 1D confinement [2,3]. The characterization of the nanoreactor structural properties combined molecular modelling, TEM, SEM, X-RD, Small Angle Neutron Scattering, DLS and UV-Vis. The structure of the gold catalyst is dependent on the hydrophobicity of the cavity surrounding the metal with nanoclusters (2.5nm) produced in hydrohopbic cavities and monoatomically thin layers in the hydrophilic cavities of the nanoreactors. The catalytic activity of Au was characterized with a model reaction: pyrrole polymerization and revealed a superior activity compared to Pt. [1] Chem. Phys. Let., 2015, 636, 216 [2] Langmuir, 2005, 21 (22), 10179 [3] Mat. Chem. and Phys, 2017, 196, 92

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