

# Arginine Linked Rhenium Wires for Inducible Nitric Oxide Synthase

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We are investigating the catalytic mechanism of mammalian inducible nitric oxide synthase (iNOS), an enzyme that produces L-citrulline and nitric oxide (NO) from L-arginine and O<sub>2</sub>. We have designed and synthesized L-arginine based substrates (wires) to characterize intermediates produced by laser-induced electron transfer to the active site. [Re(CO)<sub>3</sub>(4,7-dimethyl-phenanthroline)(imidazole-C<sub>8</sub>-NH-L-arginine-NO<sub>2</sub>)] [BF<sub>4</sub>] (**1**) binds in the protein channel with a K<sub>d</sub> = 6 ± 4 μM. A second binding site is observed with a K<sub>d</sub> = 17 ± 5 μM; after laser excitation, transient absorption measurements show that Fe(III) is reduced to Fe(II) in less than 10 ns. Rhenium N-hydroxyarginine and N-methoxyarginine wire analogs (**2,3**) will probe the second turnover of the catalytic cycle with the goal of elucidating the hydrogen source (N-OH versus N<sup>o</sup>-H) as well as determining whether neutral or anionic NO is formed.

