

A Redox-Switchable Catalyst for Olefin Metathesis

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A redox-switchable olefin metathesis catalyst was synthesized by ligating a redox-active N-heterocyclic carbene, comprised of a 1,4-naphthoquinone annulated to 1,3-dimesitylimidazolylidene (Nq-NHC), to $(\text{PCy}_3)_2\text{Cl}_2\text{Ru}=\text{CHPh}$. The resulting complex, $(\text{NqMes})(\text{PCy}_3)_2\text{Cl}_2\text{Ru}=\text{CHPh}$ (**1**), was found to undergo a reversible electrochemical reduction at relatively low potential, as determined using cyclic voltammetry. Relative to its neutral precursor (**1**), the reduced catalyst (**2**) displayed different ring-closing metathesis and ring-opening metathesis polymerization activities. Enabled by these oxidation state-dependent catalytic activities, unique copolymers of norbornene and 1,5-cyclooctadiene with tunable microstructures and physical properties were synthesized.

Reference:

Sanderson, M. D.; Kamplain, J. W.; Bielawski, C W. *J. Am. Chem. Soc.* **2006**, *128*, 16514.

