

# Influence of the lanthanide(III) ion in $\{[\text{Cu}_3\text{Ln}_2(\text{oda})_6(\text{H}_2\text{O})_6]_n\}$ (Ln(III): La, Gd, Yb) catalysts on the heterogeneous oxidation of olefins

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© The Royal Society of Chemistry 2017.  $\{[\text{Cu}_3\text{Ln}_2(\text{oda})_6(\text{H}_2\text{O})_6]_n\}$  (Ln(III): La, Gd, Yb; oda: 2-oxo-2-oxoacetic acid) are reported as reusable heterogeneous catalysts in the oxidation of olefins. An influence of the Ln(III) ion on the catalytic performance of the series is observed, where the Yb(III) based framework presents a larger activity. The mentioned heteronuclear species are catalytically more active than the corresponding homonuclear catalyst  $\{[\text{Cu}(\text{oda})_2]_n\}$ . The use of t-butyl hydroperoxide (TBHP) as an oxidant gave conversions between 73-63% for styrene oxidation and between 57-48% for cyclohexene in dichloroethane/water (DCE/H<sub>2</sub>O). In four cycles, the loss of catalytic activity was less than 10%. Experimental data permit the consideration of the redox active Cu(II) centres as the initiators of radical species generated from TBHP, which are responsible for the oxidation process of the studied olefins. Electron paramagnetic resonance (EPR) spectra of the reaction solutions, obtained