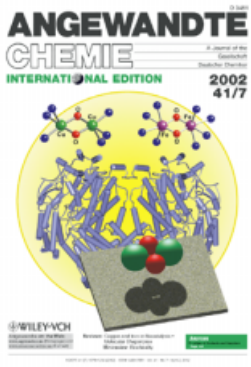
Cover Picture



Lawrence Que, Jr. and William B. Tolman

The cover picture shows $Cu_2(\mu\text{-}O)_2$ and $Fe_2(\mu\text{-}O)_2$ complexes with the $M_2(\mu\text{-}O)_2$ diamond core motif (the core is shown bottom right, M = green and oxygen = red spheres) and a representative example of a non-heme multimetal enzyme (hydroxylase component of methane monooxygenase, in the background). Although quite a familiar feature in high-valent manganese chemistry, the $M_2(\mu\text{-}O)_2$ diamond core motif has only recently been found in synthetic complexes for M = Cu or Fe. Despite differences in electronic structures that have been revealed through experimental and theoretical studies, $Cu_2(\mu\text{-}O)_2$ and $Fe_2(\mu\text{-}O)_2$ cores exhibit analogously covalent metal–oxo bonding, and similar tendencies to abstract hydrogen atoms from substrates. Our understanding of biocatalysis has been enhanced significantly through the isolation and comprehensive characterization of the $Cu_2(\mu\text{-}O)_2$ and $Fe_2(\mu\text{-}O)_2$ complexes. In particular, it has led to the development of new mechanistic notions about how non-heme multimetal enzymes, such as, methane monooxygenase, fatty acid desaturase, and tyrosinase, may function in the activation of dioxygen to catalyze a diverse array of organic transformations. To find out more see the review by L. Que, Jr. and W. B. Tolman on p. 1114 ff.