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Abstract: The reaction of solvent substituted [MoO(2)Cl(2)](THF)(2) complexes with 1 equiv. of bidentate nitrogen donor ligands leads to complexes of the type [MoO(2)Cl(2)L(2)] (L(2) = 4,5-diaza uorene-9-one; 1,10-phenanthroline-5,6-dione; 2,2'-biquinoline-4,4'-dicarboxylic acid, diethyl ester; 3,6'-bis-2-pyridyl-pyridazine; 4,4'-diethoxycarbonyl-2,2'-bipyridine) in quantitative yields at room temperature under inert gas atmosphere within a few minutes. The catalytic activity of the [MoO(2)Cl(2)L(2)] complexes in olefin epoxidation with t-butyl hydroperoxide as oxidizing agent is strongly influenced by the nature of the ligand L and its steric demand. The complexes, with the sole exception of compound 9 [MoO(2)Cl(2)(1,10-phenanthroline-5,6-dione)], are very active and highly selective epoxidation catalysts. The influence of the terminal oxo ligands together with the Lewis base ligands on the Mo center obviously keeps the compounds on a quite stable level of electron density. (C) 2009 Elsevier B.V. All rights reserved.

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