Investigations on the Redox-Photochromism of Rhodium Acetonitrile Complexes

Günther Knör
Institut für Anorganische Chemie, Universität Regensburg, D-93040 Regensburg, Germany
Reprint requests to Dr. G. Knör. E-mail: guenther.knoer@chemie.uni-regensburg.de

Z. Naturforsch. 58b, 741 – 744 (2003); received May 16, 2003

The spectroscopic and photochromic properties of the dinuclear rhodium complex Rh$_2$L$_{10}$X$_4$ (L = CH$_3$CN, X$^-$ = BF$_4^-$) have been studied in acetonitrile solution. A reversible wavelength-dependent photoredox disproportionation of the dark-equilibrated dirhodium(II) compound occurs upon irradiation with quantum yields of $\phi = 0.04$ at 254 nm and $\phi = 0.60$ at 436 nm, respectively. While the photolysis products show conspicuous aggregation phenomena at higher concentrations, a straightforward pseudo-bimolecular recombination of the metastable fragments following second-order kinetics was observed in $5 \times 10^{-5}$ M solution with $k = 0.18$ l mol$^{-1}$ s$^{-1}$ at 295 K. Both spectroscopic and kinetic results are consistent with the heterolytic formation of mononuclear rhodium(I) and rhodium(III) acetonitrile complexes in the course of the photochemical reaction.

Key words: Photochemistry, Rhodium Complexes, Electronic Spectra, Redox Reactions, Photochromism