Reaction between Yttrium Nitrate and 2,2':6',2''-Terpyridine (terpy) in MeCN: Preparation, Crystal Structures and Spectroscopic Characterization of $[Y(NO_3)_3(terpy)(H_2O)]$ and $[Y(NO_3)_3(terpy)(H_2O)] \cdot terpy \cdot 3\,MeCN$

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Z. Naturforsch. **56 b,** 122–128 (2001); received August 8, 2000

2,2':6',2"-Terpyridine Complexes, Yttrium Nitrate Complexes

The reaction of $Y(NO_3)_3 \cdot 5H_2O$ and 2,2':6',2"-terpyridine (terpy) in MeCN leads to $[Y(NO_3)_3(terpy)(H_2O)]$ (**1**) and $[Y(NO_3)_3(terpy)(H_2O)] \cdot terpy \cdot 3MeCN$ (**2**) in good yields depending on the isolation conditions. The structures of both complexes were determined by single-crystal X-ray crystallography. The Y^{III} atom in **1** is 9-coordinate and ligation is provided by one terdentate terpy molecule, two chelating nitrates, one monodentate nitrate and one terminal H_2O molecule; the coordination polyhedron about the metal may be viewed as a tricapped trigonal prism. The Y^{III} atom in **2** is 10-coordinate and its coordination sphere consists of three nitrogen atoms from the terdentate terpy, six oxygen atoms from the three chelating nitrates (one of them being "anisobidentate") and one oxygen atom from a terminal H_2O molecule; the polyhedron about the metal may be viewed as a distorted sphenocorona. The interstitial terpy is strongly hydrogen-bonded to the O atom of the coordinated H_2O molecule to form $[Y(NO_3)_3(terpy)(H_2O)] \cdots terpy$ pairs. The new complexes were characterized by IR and ^1H NMR spectroscopies. The Y^{III}/NO_3^-/terpy chemistry is compared to the already well-developed Ln^{III}/NO_3^-/terpy chemistry (Ln = lanthanide).