

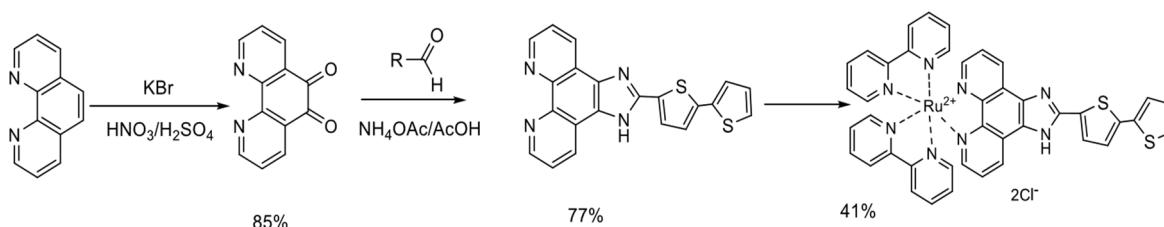
In₂O₃ based hybrid materials: Interplay between microstructure, photoelectrical and light activated NO₂ sensor properties

Abulkosim Nasriddinov ^{1,2}, Sergey Tokarev ^{1,3}, Olga Fedorova ^{1,3}, Ivan Bozhev ^{4,5} and Marina Rumyantseva ^{1*}

- ¹ Chemistry Department, Moscow State University, 119991 Moscow, Russia;
a.f.nasriddinov@gmail.com (A.N.); pergeybokarev@gmail.com (S.T.); fedorova@ineos.ac.ru (O.F.)
² Faculty of Materials Science, Moscow State University, 119991 Moscow, Russia
³ A.N. Nesmeyanov Institute of Organoelement Compounds RAS, 119991 Moscow, Russia
⁴ Quantum Technology Center, Moscow State University, 119991 Moscow, Russia;
bozhjev.ivan@physics.msu.ru
⁵ Faculty of Physics, Moscow State University, 119991 Moscow, Russia
* Correspondence: roum@inorg.chem.msu.ru; Tel.: +7-495-939-5471

Synthesis of Ru(II) complex

The synthesis of heteroleptic Ru(II) complex bis(2,2'-bipyridine-*k*²N¹,N^{1'}) [2-(2,2'-bithiophen-5-yl)-1H-imidazo[4,5-f][1,10]phenanthroline-*k*²N⁷,N⁸) ruthenium(2+) dichloride (RuTT) was carried out according to Scheme 1. The first stage was the oxidation of 1,10-phenanthroline with KBrO₃ to provide phenetrolene-6,10-dione [1]. Condensation reactions of the aldehydes with phenetrolene-6,10-dione gave the ligand as a bright crystalline compound with good yield of 77% [2, 3]. To prepare the RuTT complex an equimolar mixture of the ligand with Ru(bpy)₃Cl₂ (*cis*-bis(2,2-bipyridine)dichlororuthenium II hydrate) was kept in ethanol at 80°C in sealed ampoule in argon for 8 h [4]. After complete reaction, the crude complex was purified by column chromatography. The yield was 41%.



Scheme S1. Synthesis of Ru (II) complex.

References

- Shuzhang, X.; Tao, Y.; Yifeng, Z.; Zhao, Q.; Fuyou, L.; Chunhui, H. Multi-state molecular switches based on dithienylperfluorocyclopentene and imidazo[4,5-f][1,10]phenanthroline. *Tetrahedron*, **2006**, 62, 10072-10078.
- Batista, R.M.F.; Costa, S.P.G.; Belsley, M.; Lodeiro, C.; Raposo, M.M.M. Synthesis and characterization of novel (oligo)thienyl-imidazo-phenanthrolines as versatile p-conjugated systems for several optical applications. *Tetrahedron*, **2008**, 64, 9230-9238.
- Cai, Z.; Zhou, M.; Xu, J. Degenerate four-wave mixing determination of third-order optical nonlinear of three mixed ligand nickel (II) complexes. *J. Mol. Struct.*, **2011**, 1006, 282-287.
- Li, Z.; Yang, H.; Zhang, A.; Luo, H.; Wang, K. pH effects on optical and DNA binding properties of a thiophene-containing ruthenium(II) complex. *Inorg. Chim. Acta*, **2011**, 370, 132-140.