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Title:	Mononuclear Ag(I), dinuclear and polymeric Hg(II) complexes of 3-mercapto-4-methyl-4H-1,2,4-triazole: Syntheses, spectral, X-ray, photoluminescence and thermal analysis
Authors:	Singh, Sanjay (/jspui/browse?type=author&value=Singh%2C+Sanjay)
Keywords:	Triazole complexes Silver(I) complex Mercury(II) complexes Dinuclear complex
Issue Date:	2013
Publisher:	Elsevier
Citation:	Polyhedron, 54., pp. 131-139.
Abstract:	<p>The reactions of AgNO₃, PhHgOAc and HgCl₂ with Hmmtz gave three new complexes, [Ag(mmtz)(PPh₃)₂]·Hmmtz (1), [Hg₂(mmtz)₄(Hmmtz)₂] (2) and [Hg(mmtz)₂]_n (3) (Hmmtz = 3-mercapto-4-methyl-4H-1,2,4-triazole), which have been isolated and well characterised by CHN analyses, IR, NMR, single crystal X-ray and TG-DTA data. Complex 1 adopts a distorted trigonal planar arrangement in which Ag(I) is bonded through the thiolato sulfur atom of the mmtz anion and two phosphorus atoms of PPh₃, along with one unit of the ligand held via a weak Ag...S contact. Complex 2 has been formed by symmetrization or dimerisation in chloroform solution via the reaction 4[PhHgL]–[Hg₂L₄] + 2HgPh₂. In the dimeric complex 2, each Hg(II) centre has a distorted tetrahedral geometry bonded through two thiolato sulfur atoms of two terminal ligands, one nitrogen and one thiol sulfur (SH) from a neutral bridging ligand, forming an eight-membered ring around two Hg(II) centers. The one dimensional metal–organic coordination polymer of complex 3 is obtained by the reaction of HgCl₂ with Hmmtz in methanol, in which Hg(II) adopts a tetrahedral geometry bonded through two thiolato sulfur and two nitrogen atoms from two ligands. Complexes 1 and 2 are stabilized by intermolecular π...π interactions. Supramolecular organisation through hydrogen bonding is present in these complexes. Complexes 1 and 3 are fluorescent materials upon excitation at 263 and 327 nm respectively, exhibiting a weak emission at 389 nm and a medium-strong emission at 421 nm as a consequence of intraligand π–π* transitions. The course of the thermal degradations of complexes 1 and 3 has been investigated by TG-DTA. Thermogravimetric analysis of complex 1 shows a single weight loss to give Ag₂S, indicating that the complex might be useful as a precursor for the synthesis of pure Ag₂S nanoparticles and thin films.</p>
Description:	Only IISERM authors are available in the record.
URI:	https://www.sciencedirect.com/science/article/pii/S0277538713001368 (https://www.sciencedirect.com/science/article/pii/S0277538713001368) http://hdl.handle.net/123456789/2930 (http://hdl.handle.net/123456789/2930)
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