

# A detailed study of the vapochromic behavior of $\{TI[Au(C_6Cl_5)_2]\}_n$

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The linear-chain polymer  $\{TI[Au(C_6Cl_5)_2]\}_n$ , 1, reacts in the solid state and in solution with different volatile organic compounds such as tetrahydrofuran, acetone, tetrahydrothiophene, 2-fluoropyridine, acetonitrile, acetylacetone, and pyridine. Solid-state exposure of 1 to vapors of the above VOCs produces a selective and reversible change in its color that is perceptible to the human eye and even deeper under UV irradiation, allowing 1 to function as a sensor for these VOCs. Heating the samples exposed to the VOCs for a few minutes at 100° C regenerates the original material without degradation, even after several exposure/heating cycles. The reversibility is further confirmed by X-ray powder diffraction measurements of complex 1 before and after exposure to vapors and again after heating the samples. The products obtained by reactions of complex 1 with the above VOCs as ligands in solution contain extended linear chains of alternating gold and thallium centers with two molecules o