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Structures of New Au-N Compounds. The Shortest Au-Au Bond and Characteristic Au-Au Interactions in Dinuclear and Tetranuclear Complexes. Hanan Abdou, John P. Fackler, Jr.,* Ahmed A, Mohamed, Dept. of Chemistry, Texas A&M Univ., College Station, TX, *Author to whom correspondence should be addressed: E-mail: Fackler@mail.chem.tamu.edu

Amidinate ligands which can coordinate to Au(I) produce dinuclear, trinuclear and tetranuclear Au(I) compounds. Surprisingly, these compounds are reasonable stable and cause the formation of short Au...Au distances. Spontaneous oxidation in the presence of chloride containing solvents produces a 2.47 Å Au-Au bond in a Cl-Au-Au-Cl structure with linear N-Au(II)-Au ligand coordination. Using a 2,6-dimethylphenylformamidinate ligand, it has become possible to form di- and trinuclear complexes. The dinuclear species undergo oxidative addition reactions with halogens, methyl iodide and other oxidants to form Au(II) complexes. The trinuclear complex appears to be a structural form expected for an intermediate for tetranuclear species, however, no tetranuclear species are formed with this ligand. Using smaller ligands, tetranuclear species form as the primary product. A square or rhombus of Au(I) atoms are produced and the compounds are excellent precursors for active nanostructured gold oxidation catalysts. This paper will describe the structural chemistry of these new N-ligand species and relate their structural chemistry to the well established chemistry of dinuclear C-ligand (ylide) complexes.