An Octanuclear Gold(I) Cube with Amidinate Ligands Containing Two Hyper-coordinate Ylide Carbon Atoms

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This report is dedicated to Professor Hubert Schmidbaur on the occasion of his 75th birthday anniversary. His scientific leadership has been instrumental to the exceptional development of gold chemistry over the past forty years. This chemistry has been enjoyed by the senior author of this paper who is grateful to Schmidbaur for the many years of friendship and scientific comradery received.

Disparate properties of gold(I) converge to produce the first known cube assembly of eight Au(I) atoms connected by four *N*-bridging amidinate ligands on the sides of the cube, capped above and below by hyper-coordinate carbon atoms from a phosphorous ylide. There are no phosphines coordinated to the Au(I) atoms. The cluster is formulated as $[Au_8\{CH(\mathbf{N}C_8H_9)_2\}_4\{(\eta^5\text{-}\mathbf{C})P(C_6H_5)_2(CH_3)\}_2]$. It displays a strong green luminescence under UV light. The novel product was generated in an attempt to produce luminescent species of gold(I) with mixed C- and N-coordination, an arrangement not abundant in the literature. The formation and structure of this cluster is reported.

Key words: Hyper-coordinate Carbon, Cuboidal Octagold(I) Cluster, Phosphine-free Gold(I)