Metallocyclo- and polyphosphazenes containing gold or silver: Thermolytic transformation into nanostructured materials

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A cyclotriphosphazene bearing two 4-oxypyridine groups on the same phosphorus atom, gem-[N3P3(O2C 12H8)2(OC5H4N-4) 2] (I), and its analogous polymer [[NP-(O2C 12H4)UNP(OC5H4NM)2) 0.3]n (II), have been used to prepare gold or silver, cyclic and polymeric, metallo-phosphazenes. The following complexes, gem-[N 3P3(O2C12H8) 2(OC5H4N4(ML})2] (ML = Au(C 6F5) (1) or Au(C6F5)3 (2)), [N3P3(O2C12H8) 2(OC5H4N4[AuPPh3)),] [NO 3], (3), and [N3P3-(O2C 12H8)2(OC3H4N- 4{AgPPh2R))2][SO3CF3]2 (R = Ph (4) or Me (5)) have been obtained. Complexes 1 and 4 are excellent models for the preparation of the analogous polymers [(NP(O2C 12H8)}0.7{NP(OC5H 4N-4{ML})2}0.3]n (ML = Au(C 6F5) (Pl), Ag(OSO2CF3)PPh 3 (P2)). All complexes have been characterized by elemental analysis, various spectroscopic methods, and mass spectrometry. The polymers were further investigated by thermochemical methods (thermogravimetric analysis) and differential scanning calorimetry. For compounds 1-5 and for the starting phosphazene I,