

CHEMISTRY OF THE NOBLE GASES AND NOBLE METALS

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Almost 40 years after the first isolation of a xenon compound, bonds between noble gas atoms and F, O, N, and C have been established. This may be called the conventional bonding situation. We present here the compound $\text{Xe}_2(+)\text{Sb}_4\text{F}_{21}(-)$ with a xenon xenon bond length of 308 pm, which already much earlier has been observed in solution.¹ Some xenon chlorine interactions have also been observed before.² Here we show the synthesis of $\text{XeCl}(+)\text{Sb}_2\text{F}_{11}(-)$ with $r(\text{XeCl}) = 228$ pm, stable almost to room temperature. We will also speculate about isolation of the $\text{ArF}+$ cation. In attempts to produce AuF by reduction of AuF_3 the square planar cation $\text{AuXe}_4(++)$ has been isolated, with $r(\text{AuXe}) = 274$ pm. All three novel bonding situations of xenon require the extreme acid HF/SbF_5 for their preparation. It turns out that AuF_5 is an even stronger fluoride ion acceptor than SbF_5 . Its structure is found to be a double fluorine bridged dimer, unlike all other known pentafluorides.

1. L. Stein *et al.*, Chem. Commun. (1978) 502, JACS (1980) 2856.
2. R. D. Willet *et al.*, JACS (1977) 8202; H. J. Frohn *et al.*, Angew. Chem. Internat. Ed. (1999) 2554.