NOBLE GAS-NOBLE METAL CHEMICAL BONDING: FOURIER TRANSFORM MICROWAVE SPECTROSCOPY OF Kr-COINAGE METAL MONOHALIDE COMPLEXES.

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We have recently reported the discovery of weak Ar-metal chemical bonding in Ar-MX complexes (M=Cu, Ag, Au; X=F, Cl, Br)[c]. Initial indications were that the corresponding Kr complexes are more strongly bound. This paper reports the extension to new Kr-MX complexes (M=Ag, Au; X=F, Br), for which the stronger bonding is confirmed. The complexes were prepared by ablating a precursor (e.g SF_6, Br_2) entrained as less than 1% in a Kr-containing backing gas. The complexes were formed at the mouth of a pulsed nozzle, stabilised in a supersonic jet, and characterised by Fourier Transform microwave (FTMW) rotational spectroscopy. The complexes have been found to be rigid and to have short Kr-M bonds. Drastic changes in nuclear quadrupole coupling constants, indicating significant electron rearrangement on complex formation, are greater for the Kr complexes than for their Ar counterparts. *Ab initio* calculations indicate donation of up to 0.2 electrons from Kr to the metal; they also produce electron density contour diagrams showing significant orbital overlap between Kr and the metal.

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