We have recently reported the discovery of weak Ar-metal chemical bonding in Ar-MX complexes (M=Cu, Ag, Au; X=F, Cl, Br). 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. SF₆, Br₂) 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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