^{121}Sb Mössbauer Spectra of Hypervalent Complexes Having an Antimony-transition Metal Bond and Partial Quadrupole Coupling Constants

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Antimony-121 Mössbauer spectra for hypervalent pentacoordinate antimony compounds having Sb-transition metal bond [$Rf_2SbMCp(CO)_n$ {RfH = *o*-$C_6H_4C(CF_3)_2OH^-$, M = Fe, Ru, Cr, Mo, W}, $Rf_2SbFeCp(CO)PPh_3$, $Rf_2SbFeCp(dppe)$] and closely related compounds Rf_2SbTol (Tol = *p*-$CH_3C_6H_4$), Rf_2SbX (X = Cl, Br) are described. The strong σ-donor power of the metal fragments is demonstrated by the Mössbauer parameters. The σ-donor power decreases in the order FeCp(dppe) > $FeCp(CO)PPh_3$ > $FeCp(CO)_2$ > $RuCp(CO)_2$ > $CrCp(CO)_3$ > $MoCp(CO)_3$ > $WCp(CO)_3$ ≫ Tol. The essential trends in the molecular structure and the Berry pseudorotation are interpreted by this order. In addition, the e^2qQ values for 32 hypervalent antimony compounds are successfully calculated using the additivity model for the e^2qQ value. A unique electronic feature for Rf_2SbX is clarified through the calculation

Key words: ^{121}Sb Mössbauer Spectra; Hypervalent Compound; Organometallic Ligand; Berry Pseudorotation.