

# I-129 and Au-197 Mössbauer Spectroscopy of AuI and AgAuI<sub>2</sub>

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Mössbauer spectroscopy of <sup>129</sup>I and <sup>197</sup>Au nuclei has been applied for AuI and AgAuI<sub>2</sub> to clarify the electronic structures of the gold and iodine atoms, and to investigate the nature of the Au-I bonds. In the <sup>129</sup>I Mössbauer spectra the sign of  $e^2qQ$  is positive for AuI, whereas the sign is negative for AgAuI<sub>2</sub>. This is attributable to the difference in molecular structures: The iodine atom in AuI is bridged by two gold atoms and in AgAuI<sub>2</sub> the iodine is terminal. The <sup>197</sup>Au Mössbauer spectra suggest that the Au-I bond in AgAuI<sub>2</sub> is more covalent than that in AuI. We have revealed that AgAuI<sub>2</sub> consists of Ag<sup>+</sup> and linear [I-Au-I]<sup>-</sup> units from the Rietveld refinement of the X-ray powder diffraction pattern.

*Key words:* <sup>129</sup>I Mössbauer Spectra; <sup>197</sup>Au Mössbauer Spectra; Rietveld Analysis;  
Electric Field Gradient; Isomer Shift.